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Rhodora

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CXXVIII

LAST SURVIVORS IN THE FLORA OF TIDEWATER VIRGINIA

M. L. FERNALD

(Plates 570–583)

PART I. ITINERARY OF SEVEN FIELD-TRIPS

Continuing[1] our studies of the flora of southeastern Virginia, Mr. Bayard Long and I returned to Mrs. Bowman's at Century House, south of Petersburg, where we had found a good home and a convenient center from which to reach northward, southward and eastward on the Coastal Plain. A friend of the Gray Herbarium had established for the year a special fund for carrying forward this work and, although he most modestly requests that his name be withheld, he may be assured that his gift was carefully and, we believe, fruitfully enployed.[2]

Picking up the threads where we had left off in June, 1938, we worked steadily, in spite of heat and persecution by "chiggers," from

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[1] For preceding papers in this series see Fernald & Griscom, *Three Days of Botanizing in Southeastern Virginia*, RHODORA, xxxvii. 129–157 and 167–189 (1935)—Contrib. Gray Herb. no. CVII; Fernald, *Midsummer Vascular Plants of Southeastern Virginia*, RHODORA, xxxvii. 378–413 and 423–554 (1935)—Contrib. Gray Herb. no. CIX; Fernald, *Plants from the Outer Coastal Plain of Virginia*, RHODORA, xxxviii. 376–404 and 414–452 (1936)—Contrib. Gray Herb. no. CXV; *Local Plants of the Inner Coastal Plain of Southeastern Virginia*, RHODORA, xxxix. 321–366, 379–415, 433–459 and 465–491 (1937)—Contrib. Gray Herb. no. CXX; *Noteworthy Plants of Southeastern Virginia*, RHODORA, xl. 364–424, 434–459 and 467–485 (1938)—Contrib. Gray Herb. no. CXXIII.

[2] Part of the gift was used in support of Mr. Robert K. Godfrey's studies of his collections from the Coastal Plain of North Carolina, yet to be reported upon.

July 12th to the 23rd, with Robert Bowman driving us in his fine new car. Many spots which, earlier in the year, had been new to us were revisited and still longer familiar localities yielded much of interest. Thus, in the calcareous and fossiliferous areas of Surry County, and especially in the rich woods along the James at Eastover, a fine old plantation-home where we were cordially received (and invited to join a bathing party in the river), we renewed the discovery on the Coastal Plain of plants which belong more generally in the Piedmont or the Appalachian Valley or on the Blue Ridge or the Alleghenies: *Ptelea trifoliata,*[1] *Houstonia longifolia, Campanula americana* and *Senecio obovatus,* in addition to many reported in the last paper (of 1938). On the tidal shores of the James below Scotland (at the mouth of Crouch Creek) we had a thrilling half-day, for here was the long-sought *Aeschynomene virginica* (MAP 1), very young to be sure but a splendid find, because the species had apparently been unknown in the state since its original discovery by Clayton more than two centuries ago on the Rappahannock. Furthermore, the abundant material in fine flower and fruit subsequently collected here and farther up the James in August and September and again in August, 1939, at additional stations (one on the Chickahominy) shows conclusively that true *Aeschynomene virginica,* instead of being here near its northern limit, as we supposed, is, on the James, really at its *southern* limit. The plant of tidal shores in Virginia, Maryland, Delaware, southern New Jersey and southeastern Pennsylvania (dots on MAP 1), there centering on the tidal streams entering Chesapeake and Delaware Bays, is consistent in having larger leaves, flowers and fruits than the plant (range outlined on MAP 1) growing from Texas to southeastern North Carolina and there erroneously passing as *Ae. virginica.* The latter is apparently *Ae. hispida* Willd., by which name it was correctly known until in 1888 Britton (with the passive support of Stern and Poggenberg) incorrectly reduced it, without a word of explanation and without the bibliographic references which scholarship demands, to the northeastern *Ae. virginica.*

The two species are distinguished as follows:

AE. VIRGINICA (L.) BSP. Principal leaflets 1–2.5 cm. long; flowers 1.3–1.5 cm. long; legumes strongly torulose, 3.5–7 cm. long, with stipe 1–2.3 cm. long, the segments with thick and smooth (except for dark pustular trichomes) walls, the lowest segment 0.8–1.5 cm. long and 5–7 mm. broad; seeds 4.5–6 mm. long.

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[1] As in the previous papers I omit the authors of names which are in Gray's Manual.

AE. HISPIDA Willd.? Principal leaflets 3–9 mm. long; flowers 7–9 mm. long; legumes barely torulose, 2–5 cm. long, with stipe 3–8 mm. long, the segments with thin walls puckered over the seed, the lowest segment 5–7 mm. long and 3–4.5 mm. broad; seeds 3–3.5 mm. long.

Whether the more southern species is truly *Aeschynomene hispida*, described by Willdenow from "America *borealis*," can be settled only by study of the Willdenow type, preserved at Berlin. Professors Diels and Pilger are most accommodating in studying for us types of critical species. In the present tragic state of trans-Atlantic transportation it is quite impossible to get a prompt report upon this type. The exact determination of the identity of *Ae. hispida* must, therefore, await a more favorable occasion. I have purposely omitted the Mexican material passing under this name from the map. The name there covers a complex series of specimens.

Close by was *Scirpus novae-angliae* (MAP 2), a typical plant of the coast of eastern Canada and New England, also found on the lower Delaware, but here at a new southern limit and a few rods away from a new northern station for the subtropical *Eleocharis albida* (MAP 3); and in the great swale back of the mouth of Crouch Creek *Carex hyalinopsis* Steud., a southern species previously unknown between North Carolina and southern New Jersey, was overripe but recognizable.

Farther to the northeast we tried for two days the Peninsula of Virginia and the Gloucester Peninsula. The former Peninsula was Grimes's territory, the latter was the region best known to John Clayton, who was clerk of the Gloucester court, unless, of course, he better knew his home-region in neighboring Mathews. It was, therefore, surprising to find many to us quite obvious plants which had not previously been noted in these areas, some of them reported for the first time so far north as Virginia only within five years. *Solidago pinetorum* Small abounded in the dry open woods and we subsequently trailed it at the margin of the Piedmont nearly to the Rappahannock. How it can have escaped notice until Small in 1903 described it from North Carolina is beyond our comprehension. *Sacciolepis striata*, a most distinctive grass, was locally abundant; *Rhynchospora caduca* Ell., one of the tallest and most beautiful of species, first detected north of the Carolinas at False Cape on the North Carolina border, in 1934, was abundant in swales near the highroad which Clayton must regularly have traveled between Mathews and Gloucester. The first piece of rich deciduous woods which we entered near Gloucester

Courthouse had a fine carpet of *Galium uniflorum* Michx., the pretty species with purple pulpy fruits which, in 1935, was recorded from Princess Anne as the first north of South Carolina. In a shallow film of water in the woods slightly south of Gloucester, near White Marsh, *Eleocharis tricostata* (MAP 4) abounds. When we found it in 1937 in Isle of Wight County, our station was the first known between Georgia and New Jersey. Yet it grows near the main highway between Gloucester Port and Gloucester Courthouse! On the border of the brackish marsh near the village of North (Mathews County) we had our introduction to European marsh mallow, *Althaea officinalis.* Here it is abundant and it was a gratification to handle it, for its name is familiar in our manuals, though neither Long nor I had ever met the plant. So far as I can find it is unrecorded from south of the ancient station on Long Island, New York.

Not far from Williamsburg, in a small pool in the woods toward Lee Hall, there is a fine series of all three species of *Proserpinaca, P. palustris, P. pectinata* (not seen by Grimes) and *P. intermedia* Mackenzie, new to Virginia. This pool well illustrates the problem of botanizing in southeastern Virginia. Every natural spot has to be investigated; one cannot safely pass one of them if he wishes to find all the plants. Doubtless Grimes passed this very place many times, but nothing specially called it to his attention. *Proserpinaca intermedia* is one of the puzzling plants. Clearly distinct from both *P. palustris* and *P. pectinata* it is sometimes thought to be a fertile hybrid of those two. It often occurs with them, as at this station. Again it is found quite by itself. Here is a beautiful opportunity for a cytologist to see what he can make of the situation.

It was not far from Lee Hall that we had one of our trying adventures. Between there and Yorktown lies the Naval Mine Depot, strongly guarded by a very high and durable steel-wire fence. Signs are abundantly displayed, warning of the explosives and dangers inside the fence. There is no temptation for the ordinary traveller to trespass; but suddenly we saw within the fence a *Paspalum* quite new to us (and to Virginia), with tall culms and a great inflorescence of scores of erect spikes. We couldn't scale the fence and didn't want to risk doing so, but we had to get the *Paspalum.* Finally, after vainly trying to reach it by thrusting the longest (middle) finger through a small aperture and yearningly wiggling it in the general direction of the haughty grass, we solved the problem. Long secured a crotched branch which he managed to poke through an opening. Embracing a tall culm in the crotch he twisted and twisted, then jerked. We landed half an inflorescence, enough to settle the identity of the plant. Forced to be satisfied with that we regretfully drove on; and half-a-mile beyond our unsatisfactory poking within the Mine Depot we came to the grass outside the fence! It is only the introduced tropical *Paspalum Urvillei*, but, at least, we got real specimens; and in putting them up we were severely punished for our audacity, for the lower sheaths are heavily covered with disarticulating stiff bristles which sting like those of *Opuntia*, certainly a most unusual trait in a grass.

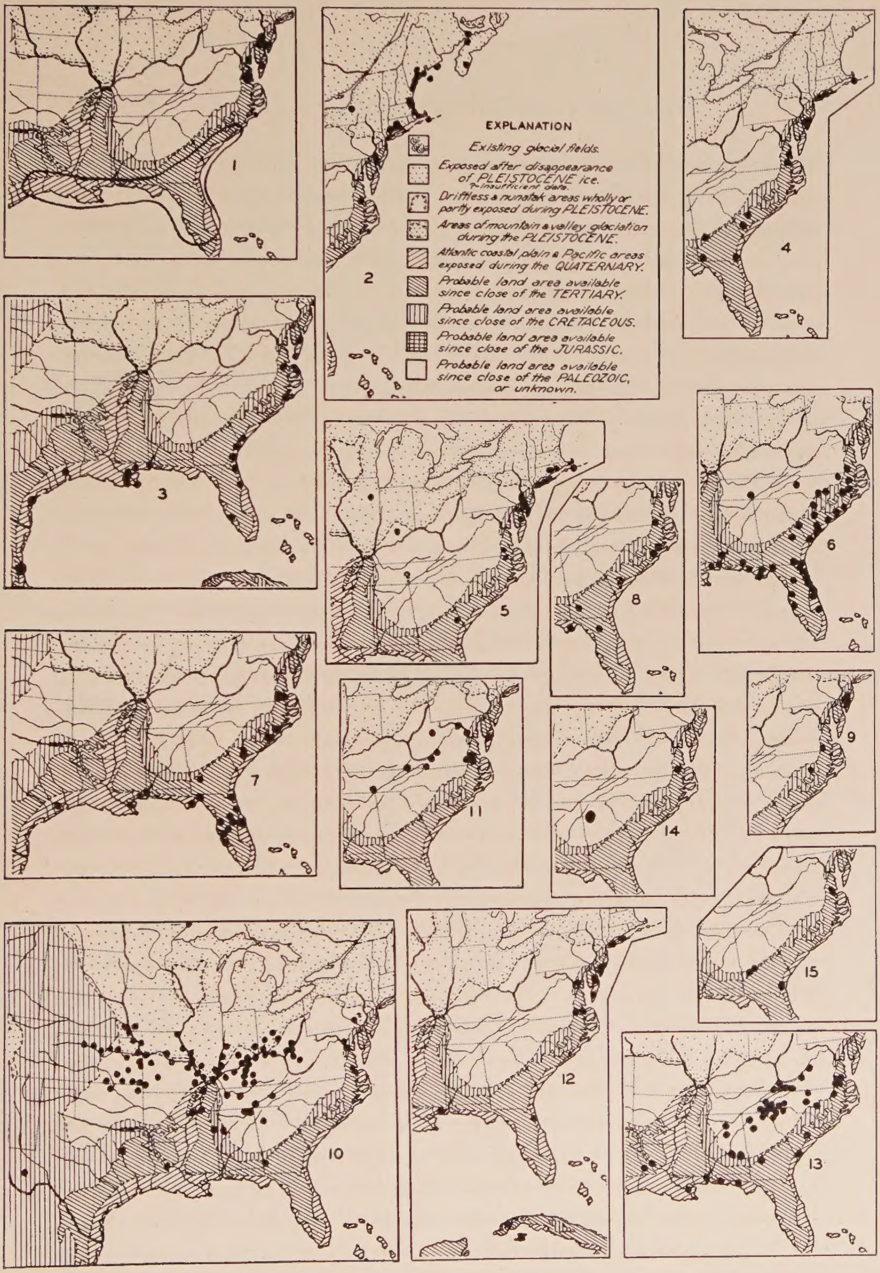
We had planned to return by driving up the Peninsula of Virginia to the Charles City ferry, but there had been heavy rains, the road was torn up and of very "slick" clay. Robert stuck gamely to the wheel until we came to an absolutely impassable tract of road, with numerous cars mired. Then we turned back and took the James City ferry. Looking up the point where we turned back we find by the map that we were slightly southeast of Hotwater. Luckily we kept out of that uncomfortable element.

South, toward the Carolina line, we got new plants at old stations: *Hypericum adpressum* (MAP 5) abundant (new to the state) in the swampy borders of woods and clearings north of Stony Creek; *Buchnera americana* with *Panicum fusiforme* Hitchcock (first north of southern Georgia) south of Burgess, the *Buchnera* also abundant (with *Schwalbea americana*) on both sides of the line between Sussex and Greensville (south of Jarratt); *Chamaecyparis thyoides*, at perhaps the first (but not the last) station in the state known to botanists outside the Great Dismal Swamp, in wet woods bordering our pine barrens south of Franklin; the little known *Malaxis Bayardi* Fernald in dry pine and oak woods near Skipper's; *Sida rhombifolia* L., extended north from North Carolina, about Courtland; *Heterotheca subaxillaris*, not recorded between North Carolina and Maryland, about Franklin; *Polygonum pensylvanicum* var. *durum* Stanford (first north of South Carolina) in several fields. But two special areas, quite new to us, must suffice as further records of our July discoveries.

Grimes had found many good things (for instance *Parnassia asarifolia* of the mountains and *Chelone Cuthbertii* Small (*C. Grimesii* Weatherby) of the Blue Ridge of North Carolina) in the spring-fed bogs bordering Whiteoak Swamp, west of Elko Station in Henrico County. It was too early for *Parnassia* and *Chelone* but we went to

Elko the last of a very rainy afternoon to reconnoiter. I went west, Long east. I immediately came upon the little known and very definite *Thalictrum macrostylum* (Shuttlew.) Small, of the uplands, and saw that a month later the area would be a choice one. Long got into a springy sphagnum-carpeted magnolia swamp and brought back *Juncus caesariensis* Coville. Grimes had it near Williamsburg; but this station is many miles northwest of there and only the second outside the Pine Barrens of New Jersey.

The last of our July stations was a gem: "The daintiest last, to make the end most sweet." At least a dozen times we had driven over the trunk-road between Emporia and the North Carolina line and we had taken side roads in search for a good bog. One afternoon in July, having stopped at the few uncultivated spots north and south of Skipper's, I remarked that if we were to find any more southern species extending into that corner of Virginia it must be "pronto"; we were within three miles of North Carolina. Despairing of finding unaltered spots, I started up a wood-road through a conventional wooded swamp. Long stayed near the car; but in two minutes I was calling for help. I had stumbled upon a beautiful little sphagnum bog and the first glance showed that our afternoon's work was begun. *Xyris* abounded; the one with broad spiraling leaves and large bulbs covered with short brown scales, *X. platylepis* Chapman, unknown from north of South Carolina, except that we had just got it north of Skipper's; the smallest species, the rare *X. Curtissii* Malme, which a few years ago was recorded from its first station north of Georgia. An old fruiting stem (only one, much dried) could belong only to the much-named *Zigadenus angustifolius* (Michx.) Watson (MAP 6). Occurring on the Coastal Plain from eastern Louisiana to Florida, thence, as we now know, to southeastern Virginia, the plant has relict colonies on the ancient Appalachian core of eastern North America. It is an ancient type still persisting. Originally put into *Helonias*, the species has been placed at times in *Amianthium*, which it superficially resembles, at times in *Zigadenus*, with which it shares the basal glands of the perianth. It is atypical in any of them and Small, with characteristic liberality, constitutes of it the newly proposed genus *Tracyanthus*. Whether it belongs to a new or an older genus, the species is obviously old. So far as we yet know there is a single small colony of it in Virginia, precariously close to a plowed field. The lower vegetation in the bog consisted of a nearly continuous


1
2
EXPLANATION
Existing glacial fields.
Exposed after disappearance of PLEISTOCENE ice.
?–insufficient data.
Driftless & nunatak areas wholly or partly exposed during PLEISTOCENE.
Areas of mountain & valley glaciation during the PLEISTOCENE.
Atlantic coastal plain & Pacific areas exposed during the QUATERNARY.
Probable land area available since close of the TERTIARY.
Probable land area available since close of the CRETACEOUS.
Probable land area available since close of the JURASSIC.
Probable land area available since close of the PALEOZOIC, or unknown.
4
3
6
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14
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Ranges of, map 1, Aeschynomene virginica (dots) and Ae. hispida (northeastern portion of range, below); map 2, Scirpus novae-angliae; map 3, Eleocharis albida (omitting Bermuda); map 4, Eleocharis tricostata; map 5, Hypericum adpressum; map 6, Zigadenus angustifolius; map 7, Burmannia biflora; map 8, Oxypolis ternata; map 9, Calamovilfa brevipilis and 2 varieties (1 in Virginia, 1 in North Carolina); map 10, Ampelamus albidus; map 11, Eupatorium sessilifolium, var. Vaseyi; map 12, Utricularia virgatula; map 13, Lilium carolinianum; map 14, Gentiana cherokeensis; map 15, Scirpus fontinalis (Georgia) and its variety (Virginia).

carpet of *Lachnocaulon anceps,* with *Panicum strigosum, ensifolium* and the other species of sphagnous bogs; and the rarer *Ctenium aromaticum* was there; great clumps of *Xyris flexuosa* (*X. arenicola* Small) abounded, as did *Carphephorus tomentosus* (Michx.) T. & G., *Aletris aurea,* the usual orchids, the two regular species of *Sarracenia* and their hybrid × *S. Catesbaei, Rhexia ciliosa* in profusion, and all the things which give charm to a real (but now very rare) eastern Virginian bog. Suddenly Long shouted "See what's here!" There, under *Lachnocaulon* and *Panicum strigosum* was an unmistakable porcelain-blue flower, *Burmannia biflora* (MAP 7), based by Linnaeus on three tiny plants collected somewhere in Virginia by Clayton, and, except for an indefinite collection of Thomas Nuttall's, subsequently unknown in the state. Later visits, in August, September and October, yielded *Burmannia* in profusion. While searching for another flowering specimen (we were too early) I came upon an extraordinary plant, very slender, with two filiform petioles each terminated by two or three linear-oblanceolate leaflets, suggesting abnormally long donkey-ears. This was one of the rarest of all Umbellifers, *Oxypolis ternata* (Nutt.) Heller, described by Thomas Nuttall from somewhere in "bushy margins of swamps, in the pine forests of North and South Carolina" but known to the monographers of the family, Coulter & Rose, in 1900, only from Apalachicola, Florida! All the stations represented in the herbarium of the New York Botanical Garden and the Gray Herbarium can be counted on the fingers (only part of them); they are indicated on MAP 8. Long, with undisguised emotion, remarked, "This is the peppiest half-hour I've had for years." But "Brer Rabbit he lay low" and soon held up a fine lot of *Utricularia juncea,* real plants with character, not the nondescript specimens simulating *U. cornuta,* such as often puzzle New Jersey botanists. But it was Long who capped the climax by finding a small colony of the New Jersey Pine Barren *Calamovilfa brevipilis,* MAP 9 (only differing from the New Jersey plant in its smaller spikelets and in having the tips of the pedicels *epilis* instead of brevipilis). The only other variety of the species is a very rare plant of eastern North Carolina. These will be discussed in Part II. Thus, at the last moment, when we were on the point of giving up this particular route as worked out, we had found one of the choicest spots in all eastern Virginia (and in July of 1939 on the same road we found still another which we had unwittingly passed without detecting at least twenty times!). Not a trip has been subsequently made to the state without calling in to see how fares our "sphagnous bog about 1 mile northwest of Dahlia." Even if nothing new is found it is a joy to see the great rarities again and to know that they are still living there.

During the August trip (14th to 25th) we promptly visited the springy sphagnous slopes and magnolia swamps near Elko Station and were surprised to find little *Xyris Curtissii* north of the James and to get *X. platylepis* which, a month earlier, had been found in Greensville County for the first time north of South Carolina. With the larger *Xyris* was *Carex Collinsii* Nutt., rare anywhere and unknown from Virginia until we found it in a bog of Sussex County. *Chelone Cuthbertii* of the Blue Ridge of the Carolinas was in splendid flower and very handsome, with rich purple corollas, and with it *Juncus caesariensis* of the New Jersey Pine Barrens was positively a common plant (much more abundant than our July observations had indicated); while the goldenrod with them proved (when flowering in September) to be typical *Solidago Elliottii* which, according to Mackenzie (in Small's Manual), had been known only from Parras Island in southeastern South Carolina; a good illustration of the mingled geographic relationships of the Coastal Plain flora. These were the high lights in late August, but along a siding near the station we gathered some good ruderals, especially *Euphorbia falcata* L., a European species apparently very rare in America, though collected some years ago, also along the Chesapeake and Ohio Railroad, by Steele in the western part of the state. It presumably follows this line across Virginia. *Chaenorrhinum minus* (*Linaria minor*) was likewise there (later found also along the Norfolk and Western, farther south), although Pennell gives its southern range in the United States as in Pennsylvania.

Somewhere north of Milford, in Caroline County, I thought I had seen from the swiftly speeding train indicators of a wet sphagnous slope. Accordingly, in spite of Long's skepticism, we went in search of it. Cross roads all the way from Woodford at the north to Bowling Green at the south were taken and miles of railroad followed in the extreme heat. We made the acquaintance of many workers along the track and of station attendants and small store-keepers. They all knew just the spot I meant, but endless following of their kindly suggestions failed to bring much to light. We were in the edge of the Piedmont and the typical Coastal Plain plants were "just not there."

A few species of the outer Piedmont as well as the Coastal Plain, like *Juncus Longii* Fernald and *Solidago pinetorum* Small, had their northern limits of range extended and we got *Najas gracillima*, whose known geographic limits have changed in every recent year; it now reaches south into Virginia! In one great area which ought to have been a good pine barren but which failed to live up to its outer appearance—dry sand and open pineland (of *Pinus virginiana*)—we were delighted to get into an extensive colony of the very rare and most distinctive *Desmodium ochroleucum*, with creamy-white flowers changing to yellowish, the fruits often spirally twisted and with some of the joints only obscurely articulated—morphologically unique among northeastern members of the genus. We were inclined to think its reputation for rarity may be due to its occurrence in areas otherwise too uninteresting to tempt a botanist! Even this discovery failed to elicit Long's comparison with other "peppy" half-hours. On this comparatively fruitless day some of our chief additions to the known flora of Virginia consisted of introduced ruderals on the railroad cinders, *Eragrostis poaeoides* and *Plantago indica* L.; while the range of *Chondrilla juncea* was extended somewhat to the south.

Another visit to the outer Piedmont showed us again very vividly how abruptly the concentrated Coastal Plain flora stops in its western extensions. Finding so many species out on the Coastal Plain but with relict or even their primary areas along the mountains, we had optimistically come to think that the outer Piedmont might perhaps share them. That this is not necessarily the case we found when we drove to Amelia Courthouse in Amelia County, to spend a very happy day with Mr. John B. Lewis, the alert and highly intelligent local naturalist. Mr. and Mrs. Lewis and their family and friends gave us a wonderful outing and Mr. Lewis took us to many choice spots. Only the merest suggestion of the Coastal Plain was apparent in the presence in one or two bogs of an occasional *Scleria* or *Rhynchospora* or of *Drosera capillaris* or *Lycopodium inundatum*, var. *adpressum* Chapm. The flora was preeminently of the Piedmont. *Crotonopsis elliptica* Willd. was new to me and to our Virginian experience but we subsequently got it on the Coastal Plain, and we were delighted to find the upland *Viburnum affine* Bush, var. *hypomalacum* Blake almost out to the Coastal Plain. But when we returned, in a few miles, from a country of two or three rare Rhynchosporas to one of twenty-five members of the genus our faith in the reality of the

Coastal Plain as a biogeographic unit was vastly strengthened! Mr. Lewis has been doing fine work in collecting the plants of Amelia; our day with him and his splendid family was an inspiration to us and we still talk of his keen knowledge of the local flora.

Back into the Coastal Plain again we proceeded, naturally, to get *Ampelamus albidus* (Nutt.) Britton of the Mississippi basin (MAP 10)! That was along the James, in Surry and Prince George Counties. At Jordan Point in the latter county it twines with the true southern and little collected white-flowered and narrow-leaved *Convolvulus sepium*, var. *repens* (see Tryon in RHODORA, xli. 421). They form a close tangle over the thickets there and, slightly below them, on the beach, *Aeschynomene virginica* occurs, the plant which so thrilled us when we got it in Surry County (p. 466). Standing in the tidal margin of the James, among the masses of *Sagittaria falcata* and other coarse plants of estuaries, there is a gigantic *Panicum*, a plant which, some years ago, had been secured over-ripe on one of the tidal creeks in Surry County. We now have good material awaiting a restudy of its section. Here also is our only station for *Rhynchospora macrostachya*. Farther north (on Cape Cod, for instance) it is typical of the most acid of quagmires and peaty pond-margins. Here, in brackish water, it seemed out of place; but we can't find it in the acid peats of southeastern Virginia, where the related *R. corniculata* abounds. Farther down river, in the Coastal Plain, we got the northern and inland *Lobelia siphilitica* along with *Campanula americana* and the other inland types, thus again demonstrating that, although the outer Piedmont is deficient in Coastal Plain types, the Coastal Plain, especially where lime prevails, is rich in inland species!

In July we had noticed that the ground nut, *Apios americana* Medikus (*A. tuberosa* Moench) occurs as two very distinct plants, one of them with dense and compact inflorescences rounded at summit (the wide-ranging and common plant); the other with lax and much prolonged tapering or spire-like inflorescences. In July the latter was too young to be convincing. Now, however, along the James in Surry County it was finely flowering; and our material from there forms the type of a well marked southern variety to be discussed in Part II. In previous seasons we had not seen *Rudbeckia fulgida* nor *Coreopsis tripteris*. Now, however (and in September), we had difficulty in avoiding them. They occur in the thickets in several counties; and their abundance where formerly we had not seen them illustrates the importance of examining every habitat at every season! One year we found *Panicum Wrightianum* almost everywhere we went; in 1938 we did not once meet it. Well south of the James, once in Dinwiddie, once in Southampton, we came upon good colonies of the very definite *Eupatorium sessilifolium*, var. *Vaseyi* (Porter) Fern. & Grisc. (map 11) of the mountains of western Virginia, West Virginia and Lookout Mt., Tennessee. It is a striking plant with the familiar Appalachian-Coastal Plain split in its range.

East of Stony Creek, in the wet pinelands ("flat pinelands" of the Carolinians) where the boreal *Carex Buxbaumii* (northern Eurasia, Greenland to British Columbia, south, very rarely to Delaware, etc.) hobnobs with the more southern *C. Barrattii* (Connecticut to southern North Carolina, with rare upland stations in Tennessee and Alabama) and with *Juncus Elliottii* (Texas to Florida, north on the Coastal Plain to Delaware, with an isolated station in Coffee County, Tennessee) (see Rhodora, xl. 381), the water was now dried away and the pineland had a floor of almost impervious dry clay. The habitat was a bit discouraging in late August but, to our delight, it was at this season characterized by the rare southern *Manisuris rugosa* (Nutt.) Ktze., the grass with inflorescences resembling series of totem-poles. New to Virginia, the northernmost member of a tropical group, it shared the dried-out clay with *Panicum caerulescens*, a rare species more typical of the flats back of coastal dunes, a plant we had never before seen in Virginia.

August had been as hot as tradition makes it; the bogs had dried out to resistant clay-beds; the back roads had baked into almost impassable ruts. It was the most disagreeable season of the year and we looked with anticipation to September, when the nights would be cooler, the autumn-flowering groups would be developed and the "chiggers" perhaps all gone.

September proved what we anticipated. Unfortunately Robert's car was not adapted to the bad roads we needed to follow and Meade Lewis, whose car was not averse to rough roads, was permanently employed. So Mrs. Bowman secured us for September (15th to 22d) the services of an older man, incapacitated for strenuous work by serious wounds in the World War. He was by preference a squirrel-hunter. His unlimited anecdotes savored of squirrels, pool-rooms and a few war-incidents; but he knew the back country and proved a valuable help in taking us to good spots. Seeing that we had a natural liking for wet pond-shores and bogs, he took us to such as could be reached, Long, coming to Petersburg by a new route, had spotted an open vegetation-carpeted shore north of the James, in Chesterfield County. Strickland knew just what he had seen and took us to the long-since drained millpond at the fall-line on Swift Creek, where, the dam having gone out, the once boomed bathing resort, Lakeview, had been deprived of its attraction and the shore vegetation had had its opportunity.

In the autumn of 1937, on the shores of a drained millpond in Southampton County, we were greatly excited by the botanizing and by the establishment there of new northern limits for such species as *Paspalum dissectum* and *Oldenlandia Boscii* (DC.) Chapm., the latter previously known only north to South Carolina; but we then little thought that a similarly drained millpond 45 miles to the north and beyond the James River would have the same vegetation. The residents of Lakeview, before the dam went out, had unconsciously been looking upon a colony of unusually interesting shore plants: carpets of *Eragrostis hypnoides, Oldenlandia Boscii,* and not merely *Paspalum dissectum* but, equally abundant and contrasting with it by its warm- instead of blue-green color and also extended north from Southampton County, *P. fluitans* (Ell.) Kunth. At one point another plant, *Hydrolea quadrivalvis,* also previously unrecorded from north of Southampton, was abundant, the tallest specimens we had ever seen. There has to be a limit somewhere, but we are anxiously awaiting notification of another broken mill-dam, to determine if these and their here unrecorded associates are the regular flora of derelict ponds throughout eastern Virginia.

The fossiliferous region of Surry County yielded additional and very extensive areas of thousands upon thousands of *Ponthieva racemosa* (Walt.) Mohr, which, although not known in Virginia before the last edition of Gray's Manual, we are coming to look upon as a frequent and abundant orchid of old calcareous woodlands; *Dirca palustris,* prevailingly a northern shrub, had its range in the Coastal Plain extended nearly to Isle of Wight County and in the old area of *Dirca,* the Canadian *Antennaria munda* and other localized species discussed in 1938, we found the northern and montane *Prenanthes altissima* pushing up out of the beds of southern *Ponthieva.* At Upper Brandon in Prince George County, another of the fine old estates on the James, we were given the opportunity to see an amazing river-bank thicket and grove: ancient trees of *Celtis* (species to be discussed in a later paper) and the regular large trees of rich shores, with abundance of *Staphylea trifolia, Ptelea trifoliata* and other types of inland calcareous thickets; and the greatest development of *Bumelia lycioides*, var. *virginiana* Fernald we can imagine, a solid thicket of this spiny small tree (up to 4 or more meters high) so crowded with fruit that it was most difficult to make flattish specimens. *Albizzia Julibrissin*, "Mimosa", of Africa and southern Asia of course was there, as all along the lower James; and over this strange assemblage of continental American, southern Coastal Plain and oriental trees the English Ivy, *Hedera Helix*, formed a great festoon, climbing into the highest branches and there heavily flowering. It was difficult to remember that we were merely in "Old Virginia".

Wishing to get really good material of *Parnassia asarifolia* at Elko Station we returned there; *Parnassia* was beautifully flowering, in the sphagnum beneath alders and bay (*Magnolia*), and near by we were delighted to find a good colony of the very local *Helonias bullata*, a plant of southern New Jersey, where it is a neighbor of *Juncus caesariensis* (abounding here), and of the Blue Ridge, where it is a near neighbor of *Parnassia asarifolia*. These were in the general vicinity of the austral *Xyris platylepis* and *Solidago Elliottii* and the Blue Ridge *Chelone Cuthbertii* already noted. They made an impressive assemblage and we sought for index-species which might lead us to another such station. The formula which resulted, "find a thicket of *Alnus serrulata*, with *Sphagnum*, Marsh Fern, *Carex leptalea* and *Aster novi-belgii*", is not likely to give complete satisfaction. If it does, the deciding factors will doubtless include the cold springs which seep out where the superficial sands and peats meet the impervious clay underneath, with sufficient slope in the background and a great wooded swamp below. The sphagnous swales in September were glorious with *Lobelia glandulifera* (Gray) Small. We had got quite used to this beautiful species with large azure-blue corollas, but the thousands of fine plants at Elko with racemes up to 4.5 dm. long are worth going a great distance to see. The wet margin of Whiteoak Swamp gave us fruiting *Styrax americana*, probably at its northern limit, and near it was the northern and inland *Bidens comosa*.

So striking is the occurrence of typical montane plants here and elsewhere on the Coastal Plain that I am tempted to interrupt the narrative, in order to moralize upon some aspects of botanical observation.

In August, 1828, William Oakes, writing to his friend, Dr. James W. Robbins, said: "The greater part of July I have spent 'down East', even as far as Quoddy Head which lieth more eastward than Eastport. I have seen there however but few plants new to N[ew]. E[ngland]. & am convinced that no great accessions to the N. E. Flora, and of absolutely new plants hardly any, are to be expected from the State of Maine."[1] That was before my day, but as a school-boy I began the discovery in Maine of plants Oakes had never dreamed of and we now know from that state, so completely dismissed by Oakes from the botanical map, no less than 115 native species which are found nowhere else in New England.

In 1882, when the American Association met at Montreal, an excursion was made down the St. Lawrence and up the Saguenay. Reporting on this excursion through an area rich in endemics, an active botanist of the time said: "Probably the prevailing feeling among botanists at Montreal, from 'The States', was one of surprise and disappointment that the Canadian flora was so familiar. At Montreal I noticed nothing of interest."[2] In view of the amazing group of endemic species along the St. Lawrence above, at and below Montreal, one can only infer that the botanical visitors of 1882 were not inclined to get their shoes muddy.[3] The estuary of the St. Lawrence is now known to share with that of the Delaware great distinction for its endemic flora. Had the visitors from "The States" put on waterproof boots and gone to the shore near Montreal they would have seen an *Epilobium* which is almost not an *Epilobium*, because its seeds have no coma, and a *Bidens* which is almost not a *Bidens* because its achenes have no awns.

In 1884 the distinguished Canadian geologist, A. P. Low, describing one of the most impressive areas in Gaspé, wrote "The top of Mount Albert is nearly flat, and is rent by a deep gorge on the east, which, near its head, splits into several smaller ones. The sides of these gorges are quite destitute of vegetation."[1] Determined to study the plants of an area "quite destitute of vegetation", my companions and I, in the past, have made three expeditions to the treeless gorges and walls of Mt. Albert and the flora which characterizes them is so unique that at least one botanist has crossed the Atlantic to investigate its components. In this, as in so many other cases, the flora is highly interesting but the "vegetation" has been thought to be lacking.

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[1] Wm. Oakes to J. W. Robbins in letter now at the Gray Herbarium.

[2] Quotation long ago noted, but source not identified.

[3] The fear of soiling one's shoes calls to mind an incident which may never have a better opportunity for recording. In the summer of 1903 I was visiting the distinguished paleobotanist, Graf zu Solms-Laubach, at his simple university professor's home in Strassburg. Count Solms was keenly interested (or politely seemed to be) in my Gaspé explorations and went so far as to say: "The Gaspé region is the one part of America which might induce me to cross the Atlantic. I want to see the stations where Logan got all those fossils." I naturally urged his joining me in the summer of 1904, for canoe- and camping-trips on the Gaspé rivers. But no! "It is impossible." But why, I asked, only to receive the same decisive negative. Upon my urging that he was a bachelor, without special family responsibilities, Count Solms finally explained: "I hear that in America you black your own boots. I couldn't sink so low as that."

Now come nearer home, to Virginia. Similar sweeping generalizations, without crawling on hands-and-knees closely to inspect the smaller and most interesting plants, have been made regarding the flora of the Old Dominion. In mid-August and September of 1843 my distinguished predecessor, Asa Gray, accompanied by William S. Sullivant, undertook a reconnoisance of the mountains from northern Virginia southwestward. In a letter to Hooker, Gray outlined his route: "I leave home this afternoon for New York, on my way to the Alleghany Mountains in the north of Virginia, where I expect to meet my excellent friend Mr. Sullivant, of Ohio. We hope to trace the more westerly ranges of the mountains down to North Carolina and Tennessee, to revisit my old ground in Ashe County, etc., and to continue our journey farther south into Georgia, coming out at Augusta on the Savannah River; thence I may go to Charleston and return by water. But if time allows I shall perhaps run through upper Georgia and Alabama, to the Tennessee River, down that to the Ohio, and thence home."[2] That of course could not have been an intensive exploration of the flora in six weeks; and on September 30th Gray wrote to Torrey from Asheville: "I doubt if I got anything of much interest in Virginia," except four species specially noted; but the glories of the mountains around Asheville, North Carolina, were much emphasized, the botanical rarities including "a little clump of Schweinitzia . . . but . . . no more", *Buckleya*, *Stewartia pentagyna*, and *Parnassia asarifolia*. Gray little realized that in western Virginia, where he reported that he did not get "anything of much interest", all four of these specialties are found. Furthermore, he was not recording his impressions of Tidewater Virginia, where he did not botanize, and he certainly did not realize that fine colonies of the Schweinitzia, the Stewartia and the Parnassia occur on the much neglected Coastal Plain of the state.

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[1] A. P. Low, Geol. and Nat. Hist. Surv. Canada, Rep. for 1882–84, 7F (1884).

[2] Jane Loring Gray, Letters of Asa Gray, i. 306 (1893).

John Clayton, more than two centuries ago sent to Leiden from Tidewater Virginia, as well as from the Shenandoah Valley and points between, hundreds of specimens; and upon these, and earlier collections of Banister, Linnaeus based nearly 400 species of North American plants. After Clayton's time no consistent or long-continued study of the Tidewater region of the state was undertaken until Kearney's famous work on the Dismal Swamp area; and in 1909 one of the most active botanists of the extreme Southern States (Georgia, Florida and Alabama), knowing Virginia chiefly from the car-window, thus dismissed the flora of the Coastal Plain: "The pine-barrens of New Jersey and those of the southeastern states have been celebrated botanizing grounds for a century or more; but in the corresponding regions between the Delaware and Roanoke Rivers there seem to be very few typical pine-barren plants, or other species, which are not more common elsewhere. It is not surprising therefore that comparatively little has been published about this region."[1]

William Oakes disapproved of the state of Maine as the possible home of localized plants because, in his inexperience, he had made only a brief wagon-trip into the most sterile and glacially most denuded corner of the state. The botanists visiting Montreal and the estuary of the St. Lawrence in 1882 missed all the interesting natives because they did not go to the primitive and undisturbed habitats; any one seeing only the nibbled roadsides and the closely farmed or browsed clearings of Quebec would gain the same superficial impression. A. P. Low, looking in vain for what he considered "vegetation" in the ravines of Mt. Albert, completely missed the remarkable endemic and epibiotic species which there make up the flora. Asa Gray, trying in six weeks to cover the whole Appalachian region from northern Virginia to Alabama, and incidentally to take in Charleston and the Tennessee valley, could pick up only the obvious. Harper, riding across different sections of Tidewater Virginia chiefly by train, could not recognize *Burmannia, Hypoxis micrantha, Xyris Curtissii, Juncus caesariensis, Pyxidanthera, Eleocharis Lindheimeri, Juncus abortivus, Festuca paradoxa, Spiranthes ovalis, Oxypolis ternata* and the hundreds of other notable species which linger in isolated and rare spots which have escaped alteration by man.

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[1] R. M. Harper in Torreya, ix. 217, 218 (1909).

Could we see eastern Virginia as it lay before Banister and Clayton there would be no dearth of botanically significant localities; but, unhappily for our reconstruction of the native flora as John Smith found it and as Banister and Clayton knew it, we have to work with almost insignificant remnants of the original flora. These are the lingering colonies, sometimes of a few individuals, sometimes patches a full rod in diameter, sometimes rare carpets of an acre or more, which, through the doubtful advantage that their tiny remnants of the ancient habitats are too wet or too dry for cultivation or otherwise not tempting as agricultural land, house-sites, hog-wallows and cow-pastures, have not yet been obliterated by man. To the great disadvantage of the original native flora of Tidewater Virginia man has there been altogether too progressive, not to say aggressive. Look at much of Norfolk County or the northeastern half of Nansemond County—mile after mile of closely farmed land, with scarcely a spot where conservative plants of specialized habitats can persist; and when a remnant of bog, too wet and sour for cultivation, is found, deep ditching has so lowered the water-table that the original rare plants have died out or hogs have been turned in because of the unlimited supply of water.

If we happen to belong to that excessively pragmatic group which sees value only in the economically profitable plants, the miles and miles of cotton-, tobacco- or peanut-fields, with their weed-floras of cocklebur, ragweed and Bermuda grass, will be wholly satisfying. If, perchance, we see interest only in the bulk-vegetation of aggressive or dominating species (those which hold their own in spite of man's activity) we shall be quite satisfied with the pastured woods of *Pinus Taeda* or *Quercus stellata* or *alba* and the pig-inhabited gum-swamps; and our greatest thrills will come in occasionally discovering a showy clump of cardinal-flower, wild azalea or lupine. If, however, we have a feeling for the real rarities we will pass the cardinal-flower and the lupine with a familiar nod and search for the more retiring and rarely seen species which to the layman are quite unknown. The reason is not simply the hunt for something others do not possess. To the scientist, whose mind has reconstructed the history of life in North America since the close of Permian time, roughly 100,000,000 years ago, every such plant fits into the picture and becomes a telling witness to the immutability of life in spite of perpetual destruction. In order to make my point clear let us review most briefly the story of our flora since the Permian.

It is generally recognized that many, if not all, the present great groups of flowering plants were well developed in Cretaceous time. So generally are remnants of many still-living groups found among early Cretaceous fossils that we are forced to the belief that they had come from ancestors of a still earlier period, presumably Permian or Jurassic; and many paleobotanists have even postulated a lost or unrecognized geological epoch in order to account for the sudden appearance in the Cretaceous of so many forms which cannot be traced back to recognized progenitors. Those who have reconstructed the Permian world show us two vast northern lands, Eria and Angara, with east-to-west seas separating them from southern Gondwana. By mid-Cretaceous time the Permian continents had become more broken: Australia (then expanded to include New Zealand) had become isolated from connection with other lands and the east-to-west median sea had severed, by a northward extension, North America into a northeastern mass, Laurentia, which connected by way of Greenland with Baltica and Angara and at the southwest terminated with the Appalachian and Ozark regions; and a western or Pacific land with a northwestern arc confluent with eastern Angara. At that time many groups now considered tropical or warm-temperate types were in the Arctic as well as on Australia, Ethiopia, Amazonia and the northern land-masses. Australia, early cut off from connection with other lands, shows the antiquity of its flora and fauna through the presence of a vast number of primitive groups and the absence of more modern types; on account of its archaic indigenous life Australia is often spoken of as "still in the Cretaceous".

Returning to North America, it becomes highly significant that on the southeastern portion of the continent we still retain a vast number of groups which in the Permian or the Cretaceous were in the Arctic but which also reached Australia before its severance from northern lands, while our opossum is our best known remnant of the ancient marsupials, which are so characteristic of the Australian fauna. Strikingly enough these groups, common to southeastern North America and ancient Amazonia, Ethiopia and Australia, are absent from the western half of the continent, the intrusion of the Cretaceous sea between eastern and western North America evidently cutting off the connection. We are, therefore, wholly justified in looking upon those groups which characterize Australia and eastern North America to the exclusion of western North America as relics, or at least descendants, with us of the Cretaceous (perhaps Permian) life which radiated out of the North, eventually to spread to the antipodes.

Concentrating more closely upon eastern North America we find that the areas we call the Appalachian Upland and the Ozark Upland have been uninvaded by seas since the beginning of modern groups of plants and animals. While Cretaceous and then Tertiary seas occupied the lower levels bordering these ancient rock-cores and Pleistocene ice accumulated to the north, much of the Appalachian and Ozarkian cores remained uninvaded. In other words, these ancient cores have been areas for occupation by plants with no interruptions, except by uplifts, since the Permian and Cretaceous types first inhabited them.

This subject has been several times developed and I do not propose now further theoretical discussion of it. My present purpose is to call attention to the very large number of these last remnants of ancient floras which have moved out from the old Appalachian (or from the Ozark) axis into the Coastal Plain. In some cases, like *Liquidambar, Taxodium, Nyssa, Liriodendron* and *Sassafras*, there is absolutely no need of special protection or conservation. In spite of their great age and their dying out through geological time in much of the terrain they once occupied, they are still virile and, in case of Sassafras, even aggressive in our area.

Dramatically interesting and phylogenetically important as is this Mesozoic forest, still virile and dominating with us, it is with the rarer and rapidly dying and overlooked aristocrats in the flora of Tidewater Virginia that I am chiefly concerned. These are the plants so rare or so insignificant that only the trained students of a flora ever see them. It so happens that Asa Gray, expanding the range covered by his *Manual* in the 2nd edition (1856), made Virginia the southeastern state in the range. When the necessity to rewrite the *Manual* became unescapable I suggested the propriety of extending the northeastern limit to include Newfoundland, where I had prosecuted much fieldwork. This proposal met with objection because of the great number of additional plants to be considered. A check shows that they total 140 species and varieties. In the brief trips to the southeastern corner of the old manual-range, in Tidewater Virginia, during the six summers up to 1939 (the time in the field totaling 110 days or 3⅔ months) my companions and I have discovered 300 (at this writing fully 400) species new to the *Manual;* and at the present rate of such discoveries we look forward to 300 more. Nevertheless, Virginia has not been dropped from the manual-range; Newfoundland has won a place in it. But "I digress"; we must return to the narrative.

The Greensville County localities again repaid visits. In the area slightly north of Emporia where *Schwalbea, Seymeria cassioides* and other local species occur, we saw fruits of *Chamaelirium luteum* projecting from the thicket. We had only once before seen it (in Sussex County) on the Coastal Plain. Strickland, making as quick a stop as possible, slowed down on the opposite side of the road—beside a colony of *Hypericum Drummondii,* a species chiefly of the Mississippi basin and the southwestern states, though once before reported from Virginia. At the Dahlia bog *Burmannia* was now mature and very attractive. A baffling series of variations or allies of *Juncus biflorus* forced itself on our attention; *Oxypolis ternata* was now in bloom and *Paspalum praecox* Walt., var. *Curtisianum* (Steud.) Vasey (*P. lentiferum* Lam.) was flowering, our only other Virginia station being in eastern Sussex. When, earlier in the season, we found the rare *Utricularia juncea* here we somewhat painstakingly prepared broad mats of the basal foliage and subterranean stems. Now, where *U. juncea* was flowering in July and August, thousands of freshly flowering needle-like stems of the excessively rare and tiny *U. virgatula* were standing! We do not know to which our mats of foliage belong (probably to both species); but this was only the second Virginian station for *U. virgatula* of Cuba, Florida, eastern Maryland, southern New Jersey and Long Island (MAP 12), the other being on the Eastern Shore.

Proceeding eastward from Skipper's we stopped at a partially overgrown clearing near Taylor's Millpond, there again finding *Hypericum Drummondii;* but the great prize was a fruiting plant of *Lilium carolinianum* (MAP 13), for, although known farther south on the Coastal Plain, *L. carolinianum* is preeminently a plant of the highest mountains (up to 5000 feet) from western Virginia to Alabama. Search failed to show another fruiting specimen (in October plenty of fine fruit was found at the border of dry woods near Skipper's and in June, 1939, we found a gigantic plant of it in Sussex County)[1]. Our last errand was to visit the bottomland of the Meherrin at Haley's Bridge, hoping the Acanthaceous plant which we got there in the spring would at last be in bloom. It certainly was blooming, some colonies with all the flowers cleistogamous, some with a few terminal petaliferous flowers, *Dicliptera brachiata* (Pursh) Spreng., the first colony known so far north as Virginia (except in Missouri).

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[1] In August, 1939, a fine station found in Prince George County.

The October trip (11 to 16) was necessarily a short one (taking advantage of Columbus Day and a long week-end). Mrs. Bowman had found a splendid driver and assistant for us, Leonard Birdsall, a keen young farmer, with previous experience in driving large truck-loads of produce north from Florida and bus-loads of school children through the back roads of Dinwiddie. Leonard at once comprehended what we were about and from his intimate knowledge of the farm-roads was able to take us to many choice spots about which otherwise we should never have known. Seeing how interested we were in the fossiliferous limy areas of Surry, he asked if we had ever visited the colonial marl-pits in Dinwiddie and Prince George. We never had, nor had we imagined lime-deposits near the surface there. When, after driving through circuitous and mystifying back roads, we left the car in dry pineland and walked toward what he assured us were marl-pockets of the early settlers, we wondered; but suddenly the oxylophytes gave way to rich vegetation including the northern red oak, (*Quercus rubra* of the manuals) and Leonard led us to the rims of the old pits, covered with colonies of such calcicolous specialties as *Aplectrum hyemale* and *Spiranthes ovalis!* Other such marl-pits, with the marl not visible at the surface, have subsequently been shown us. How the "old fellows" of colonial days knew the lime was there (deep underground) is a problem. Did they recognize the pronounced change in the vegetation?

The flat pineland east of Stony Creek had supplied a meagre but most interesting series of species at every season, beginning in June. We wanted to find an October specialty there; and we certainly succeeded. The open sphagnum-carpeted woods were now given over to a wonderful gentian, in its linear leaves and intense blue "closed" corollas suggesting the northern *G. linearis;* but at once differing in having minutely ciliolate calyx-lobes, jagged pleats as long as the corolla-lobes, and conspicuous dark bands extending from the tube up into the throat. It is a very striking member of the *G. Saponaria* series; best of all, it is an exact match for an isotype, generously presented by Dr. Pennell, of *Dasystephana cherokeensis* W. P. Lemmon, described as a very restricted endemic of the mountains of northwestern Georgia. It has not been found elsewhere, but flat pineland of the Coastal Plain of Virginia, at least 400 miles northeast of the type-region of *Gentiana cherokeensis*,[1] is also very different terrain. Here is another addition (MAP 14) to the very considerable list, already reported, of this striking geographic segregation. The specific name was given, to use its author's words, because the species is "apparently restricted to the territory anciently occupied by the Cherokee Indians". Now, however, the "Cherokee Gentian" is likewise known in the ancient land of the Powhatan!

Gentiana cherokeensis was not the only discovery in the genus. In 1936 we found the slender plant, known as *G. Porphyrio*, in the border of pine woods south of Factory Hill. At that time we labeled and reported it as from Nansemond County, Virginia. Subsequently, fearing that the colony was probably a few rods over the line, in Gates County, North Carolina, we went to unscramble the confusion we had made. On the way, *north* of Factory Hill (most definitely in Virginia) we found a splendid group of the species and when we got to our old station, as definitely in North Carolina, we found *Aster spectabilis*, var. *suffultus* Fernald, a supposed eastern Virginian endemic, growing with it (of course new to North Carolina). But to return to *Gentiana Porphyrio* (name from the purple of porphyry), the name was given by J. F. Gmelin as a substitute for *G. purpurea* Walter, not L. Walter's diagnosis called for a bright purple infundibuliform corolla; while the plant erroneously called *G. Porphyrio* has an intense azure or indigo corolla with rotate limb. It certainly is not what Walter had; incidentally it must have a new name (see Part II). Best of all, at the border of the bottomland of the Meherrin and again in a peaty clearing in pineland near Branchville we did find a gentian with infundibuliform purple corollas. It is a rare plant but there is a sheet of it in the Gray Herbarium from Beaufort County at the southeastern corner of South Carolina (Walter's country). In it we at last doubtless have real *Gentiana Porphyrio!*

Throughout the summer we had sought in vain for *Drosera brevifolia;* from late June to September it had been invisible. Now, after heavy autumnal rains and the waning of the summer heat, with the welcome cool nights, peaty depressions suddenly became covered with brilliant new rosettes of the *Drosera*. Spots in Nansemond and in Dinwiddie, where we had thoroughly inspected the ground earlier in the season were now vivid with the small foliage; again an instance showing that negative evidence must be used with caution. And, whereas we had come to think of a single bog as the home of *Burmannia biflora,* we now found it somewhat farther north, and, in following a mossy woodroad more than 25 miles to the east, in Southampton County, we came upon a solitary stray individual. Its source in the latter county is not yet located.

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[1] GENTIANA **cherokeensis** (W. P. Lemmon), comb. nov. *Dasystephana cherokeensis* W. P. Lemmon in Bartonia, no. 17: 4 (1935).

After the scientific meetings at Richmond, where, in conversation, doubt was raised by Dr. Roland Harper as to the exact status of *Pinus palustris* (Long-leaf Pine) in Virginia, Long and I induced Mr. and Mrs. Donovan S. Correll to drive with us to Harper's supposed station (seen from a train). December 31st was spent in wading in ice-water, for fruit of the various gentians of the bogs and flat pinelands. On New Years Day Long and I started to exhibit some of our choice habitats. Slowing down at our old parking-spot in the pine barrens south of Zuni, we were startled and grieved to hear Mrs. Correll announce: "Why, there's Long-leaf Pine right there!" And there it was! Intent on *Carphephorus, Polygonella polygama, Pyxidanthera, Juncus abortivus* and the other pine-barren herbs and low shrubs new to Virginia, we had half-a-dozen times brushed by the great columnar young pines without their "registering". Not only young columns were there; plenty of old fruiting trees occur. We have not yet got over our chagrin, for we promptly remembered Long-leaf Pine south of Cleopus in Nansemond County; we later collected it from specimens we had several times jostled in passing, south of Franklin in Southampton County; and in western Nansemond (near the Blackwater) we now have an area where it and *Chamaecyparis* are rapidly coming back after intensive cutting. Long and I can't jeer each other by mentioning Long-leaf Pine; that score is even! The mention of it simply makes us sad and humble.

The April recess, 1939, found us at Petersburg and Leonard on hand to help us (4th–9th). We knew that in early spring the rich woods and ravines would be most productive, fallow fields next, pinelands and bogs without much, unless we could reinstate *Bartonia verna* in the flora of the state. Consequently we started for the rich calcareous woods toward the James. *Ranunculus micranthus* at once absorbed our interest. The little plant we know farther north has opaque and villous foliage, the unlobed radical leaves subtruncate to subcuneate at base. The plant of southeastern Virginia is lustrous-green, with nearly glabrous unlobed basal leaves rounded to cordate at base, the plants relatively coarse and growing in deep calcareous woodland loam, instead of in thin films of soil about ledges. The southern plant matches Nuttall's type from Arkansas; the situation will be further discussed in Part II. *Aplectrum* was more frequent than we had ever seen it; in one piece of rich woods the rare and very early *Corallorhiza Wisteriana*, new to Virginia, was flowering; and on calcareous springy bottomlands *Cardamine Douglassii*, previously only a name to us, abounded, its purple to pinkish-white flowers decidedly earlier than the white flowers of *C. bulbosa*. *Nemophila microcalyx* proved to be common in rich woods, but *Phacelia dubia* has adopted bad practices; it is one of the regular early-spring weeds of fallow fields. Another weed, this time of lawns and grassland in the southernmost counties of Greensville and Southampton, is *Stellaria prostrata* Baldw. (*Alsine Baldwinii* Small), stated by Small to occur from "Fla. to Tex. and Ga." The residents of Emporia, Courtland and Franklin wish it would stay there. It forms dense, closely prostrate yellowish-green mats in the lawns, the slender fruiting calices upon maturity promptly disarticulating, leaving the naked pedicels. We were enthusiastically ridding the lawn at the courthouse in Courtland of this plant, "first north of Georgia," when a passing resident saw us and said: "What? You interested in that? Come over to my house and you can have a bushel of it. I won't charge you a cent, either!" We got plenty of it where we were and we did not take it all.

Another Caryophyll which greatly interested us was *Cerastium brachypodum*: "St. Louis, Mo. . . . to the Black Hills, S. Dakota . . . , westward and southward to Nevada, . . . Arizona, . . . New Mexico . . . and Louisiana" (*Robinson*, Synopt. Fl.); "Ga. to Tex., Ariz., S. D. and Ill." (*Small*). It grows at the margin of bottomland woods along Cattail Creek south of Burgess (Dinwiddie County). The plowing of a neighboring field has disturbed it, but it has not spread, like the aggressive *C. viscosum*, into the cultivated area. It looks like a case of the plow intruding upon it. At any rate, it is another first colony known north of Georgia.

In May (18th to 23rd) all the bushy clearings were golden with *Arnica acaulis* or *Senecio Smallii*. In shallow depressions the evasive *Drosera brevifolia* was beautifully flowering, the rotate corolla large for the genus, white and well over a centimeter broad; but one had to be on hand in the forenoon to see it; its flowers close promptly at noon. At our old stations (reported a year ago) *Phlox carolina* L., var. *triflora* (Michx.) Wherry was flowering, and at a new station the hundreds of plants made the damp woods brilliant. It does not stop at 3 flowers; some of our specimens show ten times that number in a single corymb. In some fallow fields *Muscari racemosa* ("Bluebottle") was an abundant and obnoxious foul-smelling weed, while extreme large-flowered *Linaria canadensis*, var. *texana* (Scheele) Pennell, new to Virginia, could be traced by series of transitions into the ordinary small-flowered plant. *Specularia biflora*, known from Virginia only through a single old collection, was a regular occupant of many old fields, but we had great difficulty in finding petaliferous flowers; they were mostly cleistogamous. In one old fallow field near Skipper's, where the colored owner greatly enjoyed and encouraged our extermination of weeds, the lower plowed margin merges into an exsiccated argillaceous pond-hole. Here we crawled on hands-and-knees, to the edification of our host, scraping up films of fruiting *Callitriche deflexa*, var. *Austini* (which Griscom and I got for the first time in Virginia in Norfolk County), and collecting gigantic specimens of *Alopecurus carolinianus*, *Agrostis Elliottiana* (new to Virginia), *Sagina decumbens* and *Viola lanceolata*, var. *vittata* (the largest plant well covering an herbarium-sheet). A few plants of *Juncus secundus*, new to Virginia, were here, but they seemed rather discouraged.

While on the ruderal and weedy types, two species of *Cerastium*, found in Southampton County, should be mentioned. Stopping south of Franklin at the margin of the swampy woods bordering the pine barrens toward Smith's Ferry (really to renew the vain search for the still too shy *Bartonia verna*, but incidentally picking up *Carex Walteriana*, var. *brevis*, *Amianthium Muscaetoxicum* and *Kalmia angustifolia*, var. *caroliniana*) we slowed down on the soft shoulder. Stepping out, we found ourselves in a colony of a very strange roadside *Cerastium*. An annual, with very dichotomous inflorescences, its bracts end in long tufts of hairs. It proves to be the comparatively rare European *C. brachypetalum* Desportes, new to North America. Still another *Cerastium* new to North America abounds along the basement of a warehouse in Courtland. It immediately attracted our attention by its nearly glabrous stems and blue-green, blunt, elliptic leaves. It is *C. vulgatum*, var. *holosteoides* Fries. Just why Courtland, on the Southern Railroad, should be so rich a center for unusual ruderal species we do not know. It is almost as good for a "peppy half-hour" as the region of the Norfolk & Western in Petersburg, and the weed-population of the two roads, both starting out of Norfolk, is different.

Now to the undisturbed habitats. The sphagnous bog northwest of Dahlia naturally won our prompt attention. There the most obvious sedge at this season was typical pubescent-fruited *Carex venusta,* known to Mackenzie (N. Am. Fl.) only from Florida to North Carolina. When we first collected it we took it to be var. *minor* (with glabrous fruits), which was now common in most sphagnous areas. Mackenzie treats the two as distinct species, in contrast to Francis Boott, Boeckeler, Bailey, Kükenthal and others who see only pubescent- and glabrous-fruited varieties. Our failure to see any difference until we got home and turned a lens on the Dahlia plant is significant! *Zigadenus angustifolius,* of which a single old fruiting scape was found the preceding July, was flowering but very scarce, only a few plants, in danger of intrusion by the plow. The plow, most unfortunately, had turned a strip about 20 feet wide on the upper edge of the bog, coming altogether too near some of the specialties. Later in the season, in June and July, it was evident that the farmer had found the land useless, very sour and wet, and the plowed strip is now an almost solid garden of *Lachnocaulon!* That at least survives; but a few more slices taken off the bog will finish *Burmannia biflora, Oxypolis ternata, Zigadenus angustifolius* and most of the other choice rarities.

During our somewhat hectic discovery in the autumn of 1938 of station after station for the new *Coreopsis oniscicarpa* Fernald in Rhodora, xl. 472, pl. 533 and 534 (1938), we had found a particularly nice colony along a seepy woodroad north of Dahlia. Thinking something else might be in so good a spot, we followed the woodroad; and there, in May, in the identical area where in October the orange-rayed and purple-black-centered *Coreopsis* abounded, we gazed upon a slender Composite with golden rays and dark center. Assuring each other that we were "all right" and not "seeing things," we discussed the phenomenon of the vernal flowering of autumnal species and particularly of the new *Coreopsis oniscicarpa.* Then, thinking it important to collect vernal specimens, we knelt in the colony. It wasn't *Coreopsis* at all, but the southern pineland *Helenium brevifolium* (Nutt.) Gray, new to Virginia! Even the rosettes of spatulate to linear-oblanceolate basal leaves are so like those of the *Coreopsis* that one has to look thrice to distinguish them.

At this season it seemed worth while to visit the old marl-pits east of Burgess Station. In May the area was a veritable garden, though the most significant plants were, paradoxically, relatively insignificant! The dominant *Carex* was *C. oxylepis*, little known in Virginia, forming great stools and very distinct in appearance, one of the few pilose-leaved species. *C. amphibola* Steud., new to Virginia, was with it and, of course, the ubiquitous *C. flaccosperma* which we once thought rare; and with them the very tall *Eleocharis tenuis*, var. *pseudoptera* (Weath.) Svenson, which had been known in Virginia only along the Potomac. And here, at last, on the rim of one of the old pits, where in October *Spiranthes ovalis* flowers, was the vernal calcicolous *Ophioglossum* in mature fruit. For some years we had been puzzled by the *Ophioglossum* which on the Coastal Plain of Virginia occurs in limy pockets and rich alluvium, with firm and highly lustrous sterile fronds, found from early April into May. Now, after repeatedly collecting it a little too young, we finally had good fruit. This collection forms the type of the southern variety to be described and illustrated in Part II.

One other day, the last to be here noted, we specialized upon two peculiar plants. In 1938 I reported (RHODORA, xl. 376, 381, 382 and 396) the discovery of a single area, about calcareous springheads in Surry County, of the little known *Scirpus fontinalis* Harper (MAP 15), a species otherwise known only about similar calcareous springheads in Georgia. Now, in May, we were delighted to find that it characterized probably all wooded springheads and bottomland woods in the area of exposed Miocene fossil-beds from Prince George southeastward through Surry. Our westernmost station is along Wall Creek in northern Prince George, our easternmost along College Run in northeastern Surry. Presumably it extends farther northeast and southwest. The very full series now at hand, in all stages from earliest flowering to dropping fruit, shows that, while the Virginia plant has all the crucial characters (narrow scales, long-beaked achenes, etc.) of the Georgian type, it consistently departs from it in the habit of the inflorescence. In Part II I shall set it off as a new variety. Occupying the same habitats and seen only there (or in rich calcareous woodland on Coggins Point) there was a giant *Myosotis*, with minute white flowers and very large fruiting-calyx. It was wholly new to us and its season is quickly over. On every calcareous bottomland, which we visited, it abounds. It must be highly selective in its choice of habitats, for its glochidiate-bristly calices promptly drop off or catch on every passing trouser-leg. Yet it stays conservatively in the calcareous woods and on the bottomlands of creeks. It proves to be real *M. macrosperma* Engelm., previously represented in the Gray Herbarium only from Texas, Arkansas and southern Missouri. It and the Georgian *Scirpus fontinalis*, which shares with it the Miocene fossil-beds of southeastern Virginia, are appropriate species with which to close this section of the paper.

Many other significant species enumerated in Part II are here omitted for want of space. Furthermore, although it is a temptation to tell something of the 94 species new to Virginia discovered on trips in June and July, 1939, those, like many of earlier date, need more study; incidentally, field-work since May, when the special fund for Phytogeographic Research became exhausted, has been supported by a grant from the American Philosophical Society. This more recent work will form the basis for a later report.

PART II. ENUMERATION AND DISCUSSION OF NOTEWORTHY SPECIES COLLECTED

The following notes follow the plan of preceding papers, of recording such species and stations as seem to be significant in working out a fuller knowledge of the flora of the state and omitting the generally common species. Although primarily a record of collections made from July, 1938 through May, 1939, note is made of a few earlier and later collections when these are important in the presentation. The cost of field-work was defrayed through a FUND FOR PHYTOGEOGRAPHIC RESEARCH most generously given for the purpose by a friend of the Gray Herbarium. The cost of preparation of the plates by my assistant, WALTER H. HODGE, has been met through an appropriation for personal research from the Division of Biology of Harvard University. The large expense of reproducing the photographs and the cost of extra paging has been most kindly defrayed by my companion on the trips and the actual discoverer of many of the rarities, BAYARD LONG. In case of our own collections it seems unnecessary to repeat the names of the collectors, *Fernald & Long*, except in the more critical discussions. As in previous notes plants thought to be new to the flora of Virginia are indicated by an asterisk (*). Many technical species collected await further study before they can be reported upon. Some of them will be discussed in later papers.

Dryopteris celsa (Wm. Palmer) Small. To the localities already noted add from Surry County: very abundant in rich deciduous woods 1½ miles east of Blizzard's Corners, no. 9235.

Asplenium platyneuron (L.) Oakes, var. bacculum-rubrum (Featherman) Fernald. Our northernmost station is in James City County: rich woods south of Hotwater, no. 8531.

Dennstaedtia punctilobula (Michx.) Moore. To the single Coastal Plain station previously reported in Surry County add from Henrico County: dry oak woods and clearings bordering Whiteoak Swamp, west of Elko Station, no. 9236. Sussex County: on base of large tree, wooded bottomland of Jones Hole Swamp, west of Coddyshore, no. 10,068.

*Ophioglossum vulgatum L., var. **pycnostichum**, var. nov. (tab. 570). Planta 1–3 dm. alta viridis; caule commune 4.5–13 cm. longo basi valde vaginato, vagina coriacea brunnea 3–7 mm. longa; lamina rotundo-ovata vel anguste ovata vel late lanceolata basi plerumque rotundata crassa lucida 2.5–8.5 cm. longa 1–4 cm. lata; sporangiis valde compressis transverse oblongis.—Rich calcareous woodlands, Maryland and District of Columbia to North Carolina and ~~sou~~thern nor/ Indiana. Maryland: Woodside, Montgomery County, June 13, 1897 (overripe), *C. L. Pollard.* District of Columbia: in ravines near Dupont Heights, July 22, 1905, *Tidestrom.* Virginia: James City County: rich heavy soil in mixed woods, near Capitol Landing, 1½ miles northwest of Williamsburg, April 19, 1921 (nearly mature), *E. J. Grimes,* no. 3444. Surry County: wooded swamp east of Spring Grove, April 7, 1939 (immature), *Fernald & Long,* no. 9696. Prince George County: low deciduous woods about 1 mile northwest of Disputanta, April 6, 1938 (immature), *Fernald & Long,* no. 7744. Dinwiddie County: rich deciduous woods about old marl-pits east of Burgess Station, May 18 and 19, 1939 (mature), *Fernald & Long,* no. 9796 (type in Herb. Gray, isotype in Herb. Phil. Acad.). Sussex County: alluvial woods, Nottoway River, northeast of Lumberton, April 3, 1938 (immature), *Fernald & Long,* no. 7741. Southampton County: rich woods, Violet Hill, near Devil's Elbow, June 23, 1936 (overripe), *Fernald, Long & Smart,* no. 5587; rich loamy wooded slope near Hart's Bridge, southwest of Sunbeam, April 4, 1938 (immature), *Fernald & Long,* no. 7742; wooded bottomland of Blackwater River, southeast of Ivor, July 19, 1939, *Fernald & Long,* no. 10,471 (all sterile). Greensville County: bottomland woods by Metcalf Branch, east of Emporia, April 8, 1938 (nearly mature), *Fernald & Long,* no. 7743. North Carolina: moist open woods near Windsor, Bertie County, April 11, 1932 (immature), *E. J. Palmer,* no. 39,797. Ohio: Clermont County, May, 1873 (overripe, sporangia all dehisced), herb. *Chas. E. Faxon.* Indiana: "with sugar maple, sedge [red?] ash and *Botrychium obliquum,*" Lowry's woods, Marshall County, May 26, 1933 (mature), *R. M. Kriebel,* no. 176. See p. 492.

The plant of calcareous rich woodlands of southeastern Virginia (to be looked for in all the Miocene marl-beds) is very unlike the plant of northern peaty meadows, wet sands and drier acid soils which erroneously passes in North America as typical *Ophioglossum vulgatum*. So impressed were we by the very early (April to June) development of the plant, its calcareous habitat, its dark-green, lustrous, mostly ovate sterile fronds, its transversely oblong crowded sporangia (FIGS. 7–9) and the persistent brown basal sheaths (FIGS. 2–6), that I turned with confidence for clarification to Dr. Clausen's Monograph.[1] There, however, only disappointment was met; Clausen sees nothing of importance in the varieties proposed within *O. vulgatum*, lumping them all, whether from Eurasia, the acid bogs, swales and sands of Canada and the Northern States, the calcareous woodlands of the Southern and Central States, or Mexico or Africa as one plant quite unworthy of any geographic segregation. Even the very definite *O. vulgatum*, var. *alaskanum* (E. G. Britton) C. Christensen, which is maintained not only by Christensen but by Hultén, who is likewise familiar with typical European *O. vulgatum*, is reduced outright by Clausen; and many other proposed species and varieties are swept into one undifferentiated mass. This easy and over-conservative viewpoint, which will not be indorsed by those who intimately know the plants in the field but by which troublesome old names are uncritically disregarded, is expressed as follows: "Various trivial forms and varieties, based largely upon size of plant and shape of sterile blade, have been described, but since they seem to represent normal variations of any local population of this species, they are not considered in this discussion" (Clausen, p. 124).

Typical Eurasian *Ophioglossum vulgatum* (PL. 571) seems not to occur in America. In some characters it is approached by var. *alaskanum*, in others by the plant of southern Canada and the Northern States, in others by the calcicolous var. *pycnostichum*. True *O. vulgatum* has a definite chartaceous or coriaceous sheath (FIGS. 1 and 3–7) surrounding the common stalk; its sterile frond is most often ovate or oval, with commonly rounded base, and described as pale- or yellowish-green and opaque; and its sporangia (FIGS. 8 and 9) are in outline suborbicular to quite round. It is well illustrated in many European plates, those which show the rhizome also picturing the sheath surrounding the common stalk. See, for example, Smith & Sowerby, Engl. Bot. ii. t. 108 (1793); Syme, Engl. Bot. xii. t. 1835 (1886), where the description is perfectly clear: "the frond, with its base enveloped in an olive-brown stipule-like sheath"; and J. Britten, Europ. Ferns, opp. p. 185 (1880–82).

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[1] Robert T. Clausen, *Monograph of the Ophioglossaceae*, Mem. Torr. Bot. Cl. xix. no. 2 (1938).

The common plant (PL. 572) of acid or subacid soils (often boggy meadows, swales or damp sands, but sometimes dry and more exposed habitats) from eastern Canada to Washington and rather generally in the Northern States has the common stalk naked at base (FIGS. 1 and 2, and 4–7), the pale and opaque sterile frond oblanceolate, narrowly obovate, elliptic or lanceolate, and usually tapering gradually to base. In these characters it is unlike most Eurasian plants (with basal sheath and usually more ovate frond rounded at base); but the plant of Canada and the Northern States has the suborbicular sporangia (FIGS. 8–10) much as in typical Eurasian *O. vulgatum*. It is beautifully shown in D. C. Eaton, Ferns N. Am. ii. t. lxxxi, figs. 1–4 (1880). The earliest name for our common oxylophytic plant with sheathless fronds is *O. pusillum* Raf. in Desv. Journ. Bot. sér. 2. iv. 273 (1814) (apparently overlooked by Clausen), described

> "41. *Ophioglossum pusillum;* feuille glabre, lancéolée aiguë, petiolée; épi plus long que la feuille. *Pensylvanie* (deux à trois pouces.)"

At the same time Rafinesque published

> "40. *Ophioglossum pubescens;* feuille pubescente. N. *Jersey.*"

What the latter is I leave to New Jersey botanists; Clausen, who has been much in New Jersey, failed to clarify it (see his p. 164). But Rafinesque's *O. pusillum*, antedating (and therefore invalidating) *O. pusillum* Nutt. (1818), is also *O. Grayi* Beck, Bot. No. and Mid. U. S. 458 (1833) (name overlooked by Clausen). That, however, was a provisional name only and, therefore, invalid; incidentally it was inadequately described and only vaguely typified: "Dr. Gray has found 2 or 3 specimens of a fern which resembles this [the Nova Scotian *O. vulgatum*] in its specific characters, but is scarcely 2 inches high. It may prove on further examination to be a distinct species. If so, I would propose for it the name of *O. Grayi.*"

As stated, a provisional name, like *Ophioglossum Grayi,* is illegitimate. Incidentally the description and typification are inadequate; and it is established by the data in the Gray Herbarium that the dwarf specimens referred to were sent to Gray from Exeter, Otsego

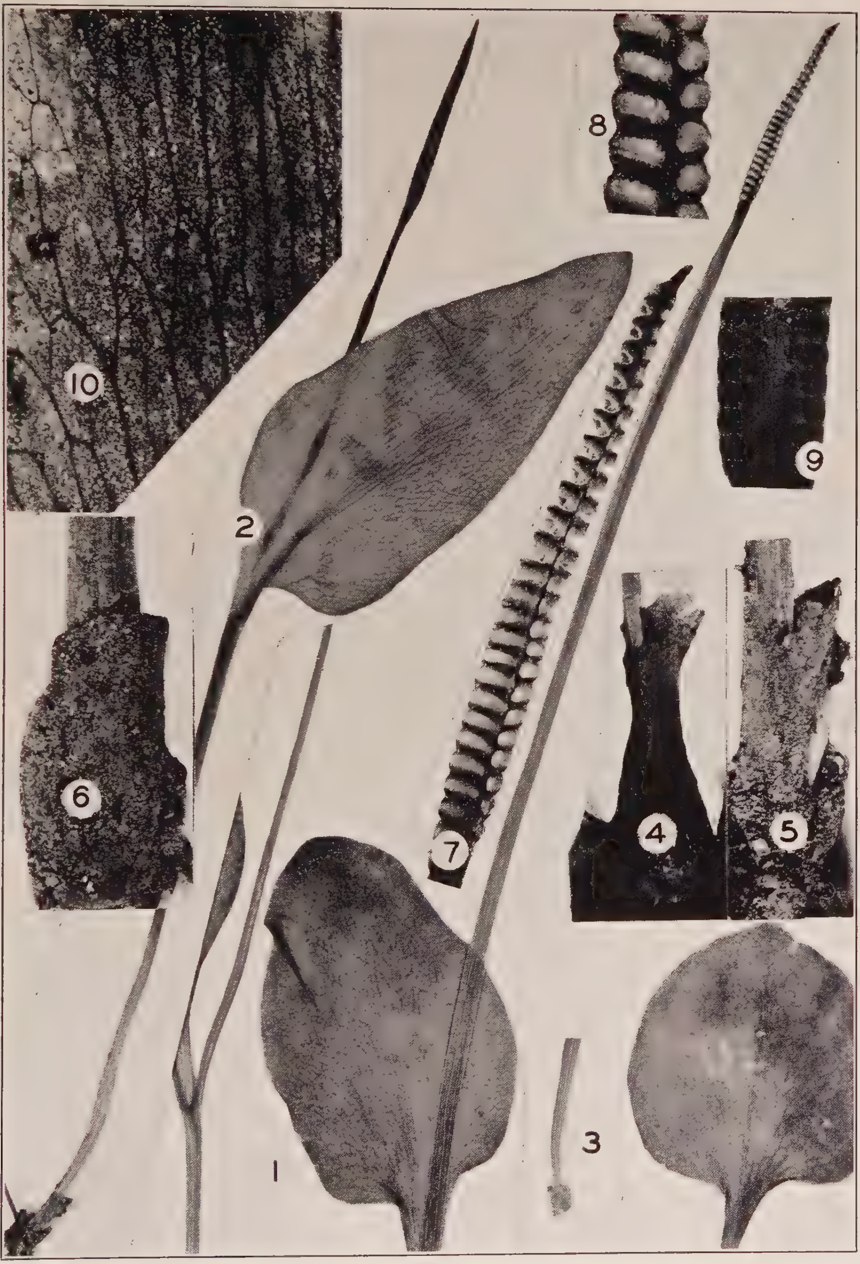

Photo. W. H. Hodge

Ophioglossum vulgatum, var. pycnostichum: fig. 1, type, × 1, from east of Burgess Station, Virginia; fig. 2, plant, × 1, from Capitol Landing, Virginia; fig. 3, basal sheath, × 1, from the type; fig. 4, basal sheath, × 5, from Capitol Landing, Virginia; fig. 5, basal sheath, × 5, from Marshall ~~Township~~, Indiana; fig. 6, basal sheath, × 5, from District of Columbia; fig. 7, fruiting spike, × 3, from the type; fig. 8, mature sporangia, × 10, from Indiana; fig. 9, immature sporangia, × 10, from District of Columbia; fig. 10, venation of sterile segment, × 5 (by transmitted light), from Disputanta, Virginia.

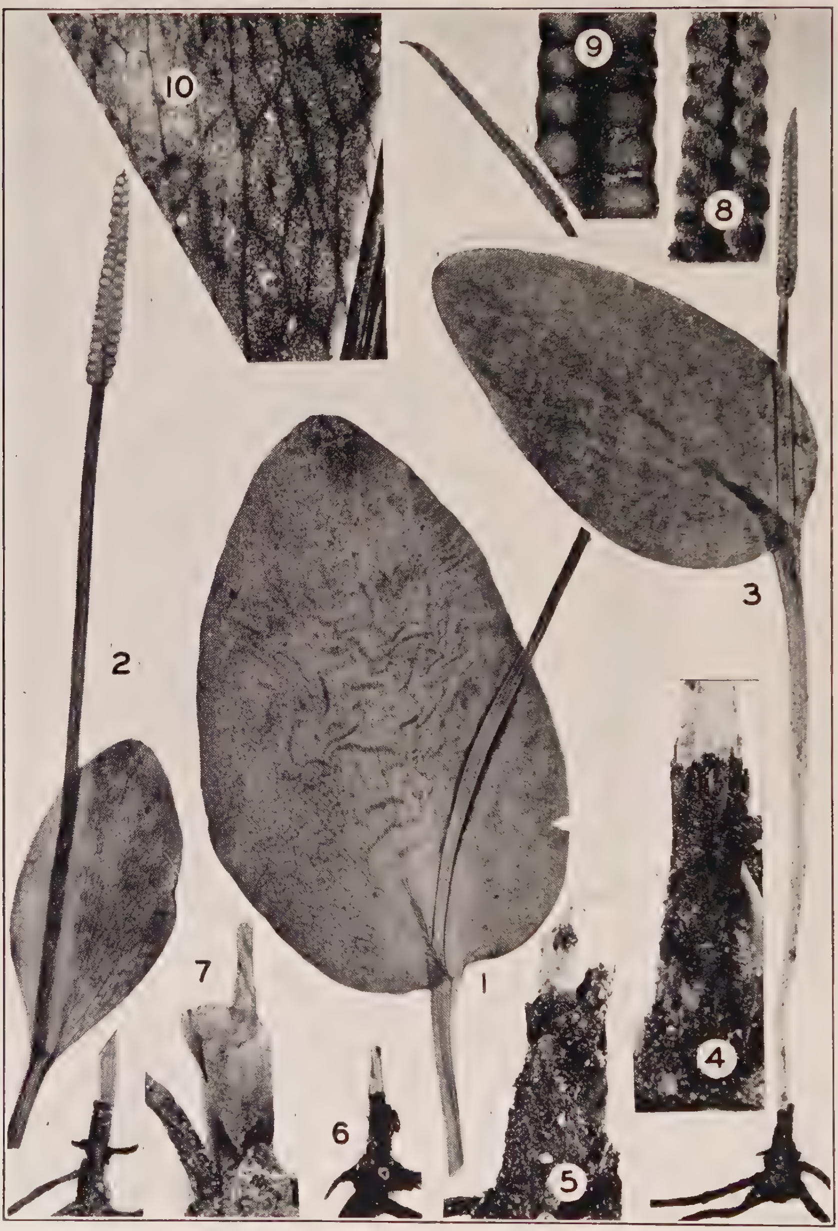

Photo. W. H. Hodge

Ophioglossum vulgatum, typical var.: fig. 1 (including base at extreme left), portions of plant, × 1, from Austria; fig. 2, portion of plant, × 1, from Sweden; fig. 3, plant, × 1, from Scandinavia; fig. 4, basal sheath, × 5, from Austria; fig. 5, basal sheath, × 5, from Scandinavia; fig. 6, basal sheath, × 1, from Austria; fig. 7, basal sheath, × 5, from Japan; fig. 8, sporangia, × 10, from Austria; fig. 9, sporangia, × 10, from Sweden; fig. 10, venation of sterile segment, × 5, from Austria.

County, New York, by Dr. Curtis.[1] The name *O. Grayi* is wisely discarded. The dwarf specimens which Dr. Gray had and which he supplied to Beck are of the small extreme later properly described and illustrated as *O. arenarium* E. G. Britton in Bull. Torr. Bot. Cl. xxiv. 555, tt. 318 and 319, fig. 3 (1897). That this is only the most dwarfed extreme of our northern plant is now usually conceded. In 1911 slightly larger individuals from a swamp in Delaware County, Pennsylvania, with the sterile frond prolonged into a linear base, were described as *O. vulgatum*, var. *lanceolatum* Clute in Fern. Bull. xix. 72 (1911). This material is an extreme of the northern plant, but the name can not be maintained because of *O. vulgatum*, var. *lanceolatum* Luerss. (1878), an Australian plant which is included in *O. Prantlii*

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[1] In ed. 1 of his Manual, 636 (1848), under *O. vulgatum*, Gray said: "A few immature specimens of a remarkably dwarf state, 1′–2′ high, with the young spike almost sessile, were gathered by Dr. Curtis, in Otsego county, New York." Somewhat earlier, thinking it a new species, he had given some to Beck and more of it to Torrey, with the suggestion that it was distinct from *O. vulgatum*. The following excerpt from Mrs. Britton's *Revision of the North American Species of Ophioglossum* (Bull. Torr. Bot. Cl. xxiv., especially pp. 546, 547 (1897)) is explanatory.

"In the Torrey Herbarium, unnamed, there is a sheet with six small immature specimens, two bearing fertile spikes and the following note by Dr. Gray:

> *Ophioglossum* n. sp. I send you ½ I have and probably shall not be able to procure any more very soon. 15 to 20 specimens were found on a dry hill at Exeter (Otsego Co.) 12 of them in fruit. A few specimens are in the hands of a friend who first noticed it, Dr. Hadley has a specimen and I sent some to Beck 2 years ago (the same summer it was discovered). He has never given an opinion or said a word about it. I do not know that *O. vulgatum* or any other species has been found in this section. It appears to come near *O. pusillum* Nutt. but that species has 'frond cordate acute'—this has the frond *acute at the base* and obtuse at the extremity. These specimens are as large as any that have been found.
> If you think it new suppose you publish it.
>
> A. G."

Gray, it is obvious, was not at first and in his youthful inexperience content to place the plant of Otsego County with the Eurasian *Ophioglossum vulgatum*, a view in which he was entirely right! Still earlier Thomas Nuttall had expressed doubt about the identity of our plant with the European, in his Genera of North American Plants, ii. 248 (1818) describing his new *O. pusillum* and admitting a second species: "*O. vulgatum?* Frond oblong-ovate, obtuse, closely reticulated. Probably distinct from the European species." This healthy skepticism was soon overwhelmed by the weight of "authority" and, instead of seeing the actual differences, most later botanists have been content to overlook them, again illustrating the truth, that in critical taxonomic study inert ultraconservatism may be as misleading as alert radicalism!

C. Chr. (1906). Dr. S. F. Blake, without noting the fundamental characters which separate the American from the Eurasian plants of *O. vulgatum,* defined two leaf-forms of the former: forma *lanceolatum,* based on Clute's var. *lanceolatum* (already noted) and forma *pseudopodum* Blake in Rhodora, xv. 87, fig. 1 (1913), typified by a collection from New Hampshire with unusually prolonged sterile frond. This was later raised to varietal rank as *O. vulgatum,* var. *pseudopodum* (Blake) Farwell in Rep. Mich. Acad. Sci. xviii. 84 (1916). As the earliest varietal name var. *pseudopodum* seems to be the proper one for the commonest American variety.

Returning to var. *pycnostichum* (pl. 570), in outline of sterile frond and in its persistent basal sheath it strongly suggests typical Eurasian *O. vulgatum;* but it is quickly distinguished by its firm, dark-green and lustrous fronds and especially by the crowded and transversely oblong sporangia (figs. 1 and 7–9). In the latter characters it stands far apart from the others.

My interpretation of the North American varieties of *Ophioglossum vulgatum* may be summarized as follows.

[O. vulgatum L. Sp. Pl. ii. 1062 (1753). Common stalk surrounded at base by a brownish chartaceous or coriaceous sheath; sterile frond usually ovate or oval, with rounded base, yellowish-green, opaque; sporangia suborbicular or round in outline.—Eurasia. Plate 571.]

Var. alaskanum (E. G. Britton) C. Chr. in Hultén, Kungl. Sv. Vet. Akad. Handl. v. no. 1 (Fl. Kamtch.), 45 (1927). *O. alaskanum* E. G. Britton in Bull. Torr. Bot. Cl. xxiv. 556, t. 319, fig. 5 (1897). Sterile frond thin, translucent, ovate, rounded at base, the venation very evident, recalling that of *O. reticulatum;* sporangia round.—Alaska and Kamtchatka.

Var. pycnostichum Fernald, supra. Common stalk surrounded at base by a brownish firm sheath; sterile frond round- to narrow-ovate or broadly lanceolate, mostly rounded at base, dark-green, firm, lustrous; sporangia crowded, transversely oblong.—Rich, chiefly calcareous woods, Maryland to North Carolina and southern Indiana. Fruiting from May to July. Plate 570.

Presumably some of the specimens cited by Clausen from the southern part of the range belong here.

Var. pseudopodum (Blake) Farwell in Rep. Mich. Acad. Sci. xviii. 84 (1916). Forma *pseudopodum* Blake in Rhodora xv. 87, fig. 1 (1913). *O. pusillum* Raf. in Desv. Journ. Bot. sér. 2, iv. 273 (1814). *O. Grayi* Beck, Bot. No. and Mid. U. S. 458 (1833), provisional (invalid) name. *O. arenarium* E. G. Britton in Bull. Torr. Bot. Cl. xxiv. 556, t. 318 and t. 319, fig. 3 (1897). *O. vulgatum,* forma *arenarium* (E. G. Britton)

Clute, Our Ferns in their Haunts, 47, 316 (1901). *O. vulgatum*, var. *lanceolatum* Clute in Fern Bull. xix. 72 (1911) not Luerss. (1878). *O. vulgatum*, forma *lanceolatum* (Clute) Blake in Rhodora, xv. 87 (1913). *O. vulgatum*, forma *pusillum* (Raf.) House in Bull. N. Y. State Mus. cclxiii-cclxiv. 42 (1923).—Peaty or grassy swales, wet thickets and shores, damp sands, sterile pastures, etc., Quebec to Washington, south at least to Delaware, Pennsylvania, Ohio, Indiana, Illinois, Nebraska, Arizona and Mexico (the latter with the undescribed synonym *O. Pringlei* Underwood ex Clausen, l. c. 125 (1938) in synonymy). Fruiting from late May to August. Plate 572.

The smaller plants have been erroneously referred to var. *minus* Moore of Europe.

Explanation of Plates 570–572

Plate 570. Ophioglossum vulgatum L., var. pycnostichum Fernald: Fig. 1, type, × 1, from east of Burgess Station, Virginia, *Fernald & Long*, no. 9796; fig. 2, plant, × 1, from Capitol Landing, Virginia, *Grimes*, no. 3444; fig. 3, basal sheath, × 1, from the type; fig. 4, basal sheath, × 5, from *Grimes*, no. 3444; fig. 5, basal sheath, × 5, from Marshall Township, Indiana, *Kriebel*, no. 176; fig. 6, basal sheath, × 5, from Dupont Heights, District of Columbia, July 22, 1905, *Tidestrom;* fig. 7, fruiting spike, × 3, from the type; fig. 8, mature sporangia, × 10, from *Kriebel*, no. 176; fig. 9, immature sporangia, × 10, from *Tidestrom;* fig. 10, venation of sterile segment, × 5, from Disputanta, Virginia, *Fernald & Long*, no. 7744.

Plate 571. Ophioglossum vulgatum, (typical): Fig. 1 (including base at extreme left), portions of plant, × 1, from near Vienna, Austria, June 12, 1895, *Dörfler;* fig. 2, plant, × 1, from Grönskär, Södermanland, Sweden, July 17, 1927, *Asplund;* fig. 3, plant, × 1, from Scandinavia, June 27, 1882, *Tharsson;* fig. 4, basal sheath, × 5, from Vienna specimen, *Dörfler;* fig. 5, basal sheath, × 5, from Scandinavian plant, *Tharsson;* fig. 6, basal sheath, × 1, from Vienna plant, *Dörfler;* fig. 7, basal sheath, × 5, from Todahara, Mushashi, Japan, May 24, 1891, *Watanabe;* fig. 8, sporangia, × 10, from Vienna plant, *Dörfler;* fig. 9, sporangia, × 10, from Swedish plant, *Asplund;* fig. 10, venation of sterile segment, × 5, from same plant as fig. 1.

Plate 572. Ophioglossum vulgatum, var. pseudopodum (Blake) Farwell: Fig. 1, plant, × 1, from Dixville Notch, New Hampshire, July 27, 1906, *E. F. Williams;* fig. 2, plant, × 1, from Cedar Lake, Nova Scotia, *Fernald, Bean & White*, no. 19,483; fig. 3, isotype, × 1, of *O. vulgatum*, forma *pseudopodum* Blake; fig. 4, base of common stalk, × 5, from Nova Scotia, no. 19,483; fig. 5, base of common stalk, × 5, from Dixville Notch, New Hampshire, *Williams;* fig. 6, base of common stalk, × 1, from Willoughby, Vermont, July 21, 1896, *Kennedy;* fig. 7, base of common stalk, × 5, from same collection as fig. 6; fig. 8, sporangia, × 10, from the Nova Scotian plant, no. 19,483; fig. 9, sporangia, × 10, from the Willoughby plant; fig. 10, sporangia, × 10, from isotype of *O. vulgatum*, forma *pseudopodum* Blake.

Pinus palustris Mill. Local. Nansemond County: white sand of pine barrens southwest of South Quay, no. 10,084; also seen in white sand, south of Cleopus. Isle of Wight County: open white sand in dry pine barrens, south of Zuni, *Fernald, Long & Correll*, no. 9676. Southampton County: dry sandy open pine and oak woods 6 to 7 miles south of Franklin, no. 9798.

At the Zuni station and below South Quay numerous old and fruiting trees as well as seedlings; at the other stations mostly young trees. See p. 488.

Chamaecyparis thyoides (L.) BSP. Southampton County: several large trees in wooded swamp about 7 miles south of Franklin, no. 8535. See p. 469. Nansemond County: many large fruiting trees and seedlings in wet wooded depression in pine barrens east of Cherry Grove, south of South Quay, no. 10,475.

Certainly highly localized in Virginia; perhaps not elsewhere known outside the Great Dismal Swamp. See pp. 469 and 488.

*Najas gracillima (A. Br.) Magnus. Caroline County: peaty pond-hole southeast of Milford, no. 8914. See p. 474.

Extension southward.

Potamogeton capillaceus Poir. To the single reported station in Nansemond County add the following. Isle of Wight County: rills, sandy and peaty border of Cat Pond, south of Benns Church, no. 8019. Southampton County: floating at border of Predler's Pond, Nottoway Swamp, southwest of Sedley, no. 8018; border of peaty pool in cypress-gum swamp, about 4 miles northeast of Capron, no. 7196. Greensville County: pool in *Cephalanthus* swamp, about 1 mile north of Skipper's, no. 8537.

Eragrostis hypnoides (Lam.) BSP. To the few stations add one in Chesterfield County: margin of exsiccated old mill-pond in Swift Creek, Lakeview, no. 9272. See p. 477.

*E. poaeoides Beauv. Caroline County: railroad gravel southeast of Guinea, no. 8959. Dinwiddie County: cinders in freight-yard of Norfolk and Western Railroad, Petersburg, no. 10,523. See p. 474.

No Virginian station indicated in Hitchcock's *Manual*.

*E. hirsuta (Michx.) Nees, var. **laevivaginata**, var. nov., vaginis glabris.—Maryland to Florida. Type from wooded alluvial bottomland of Meherrin River, near Haley's Bridge, Southampton County, Virginia, *Fernald & Long*, no. 9273 (type in Herb. Gray; isotype in Herb. Phil. Acad.).

Typical *Eragrostis hirsuta*, based on *Poa hirsuta* Michx., has strongly hirsute sheaths. It was described from South Carolina and is represented in the Gray Herbarium only thence to Florida and westward to Louisiana and Oklahoma, with the exception of Blake's no. 11,675 from a road-working in Arlington County, Virginia. All other material before me from Maryland, Virginia (Northampton, Princess Anne, Nansemond, Greensville, Southampton and Prince George Counties) and North Carolina and much from Georgia and northern Florida (for example, *Nash*, no. 2521, from Tallahassee) has all or all but the very lowest sheaths quite glabrous except for the marginal and apical ciliation. This is so striking a departure from the generally more southern and western hirsute-sheathed plant that it is clarifying to have a designation for it. By the key in Hitchcock's Manual the student would be unable to identify the relatively common *E. hirsuta*, var. *laevivaginata*, for in Hitchcock's key the only provision for the inclusive species (p. 141) is under "Sheaths pilose or hirsute," although the description of *E. hirsuta* (p. 158) allows "sheaths hirsute to glabrous."

*FESTUCA OCTOFLORA Walt., var. TENELLA (Willd.) Fern. in RHODORA, xxxiv. 209 (1932). SUSSEX COUNTY: fallow sandy fields and roadsides 4 miles northwest of Homeville, no. 9835.

Our only collection of the small and mostly northern var. *tenella*. Typical southern *F. octoflora* is common.

MELICA MUTICA Walt. occurs as two forms on the Coastal Plain of Virginia. Typical M. MUTICA (*M. glabra* Michx.; *M. mutica*, var. *glabra* (Michx.) Gray), the plant with glabrous or merely scabrous sheaths, we have from the following stations. ELIZABETH CITY COUNTY: Hampton, May 1, 1894, *J. R. Churchill*. PRINCESS ANNE COUNTY: rich woods, Cedar Island, *Fernald, Griscom & Long*, no. 4560. SURRY COUNTY: rich calcareous wooded slopes along James River, Claremont Wharf, no. 9828 (1 m. high). DINWIDDIE COUNTY: borders of dry oak and pine woods north of Burgess Station, no 9827.

M. MUTICA Walt., forma **diffusa** (Pursh), comb. nov. *M. diffusa* Pursh, Fl. Am. Sept. i. 77 (1814). Var. *diffusa* (Pursh) Gray, Man. ed. 5: 626 (1867). With copiously pilose sheaths and, often, blades. NANSEMOND COUNTY: wooded slope, Kilby, no. 6484. SURRY COUNTY: rich wooded slope at head of Sunken Meadow Creek, south of Claremont, no. 7755. DINWIDDIE COUNTY: borders of dry oak and pine woods north of Burgess Station, no. 9829.

Very striking in its extreme, with gray-pilose sheaths and blades, forma *diffusa* occurs through much, if not all of the range of typical glabrous- or merely scabrous-sheathed *M. mutica*. It is therefore best treated as a form.

*CALAMOVILFA BREVIPILIS (Torr.) Scribn., var. **calvipes**, var. nov. (TAB. 573, FIG. 1 et 2), foliis scabris; paniculis valde exsertis laxe ovoideis 1.3–2 dm. longis 0.7–1 dm. diametro, ramis patentibus vel laxe subadscendentibus; pedicellorum apicibus nudis; spiculis 4–5 mm. longis; lemmatibus paleisque subaequalibus valde strigosis.—VIRGINIA: sphagnous bog about 1 mile northwest of Dahlia, Greensville County, July 15, 1938, *Fernald & Long*, no. 8548 (TYPE in Herb. Gray; ISOTYPE in Herb. Phil. Acad.). In PLATE 573, the habit, × 2/5 is shown in FIG. 1; a spikelet, × 10, in FIG. 2. See p. 472 and MAP 9.

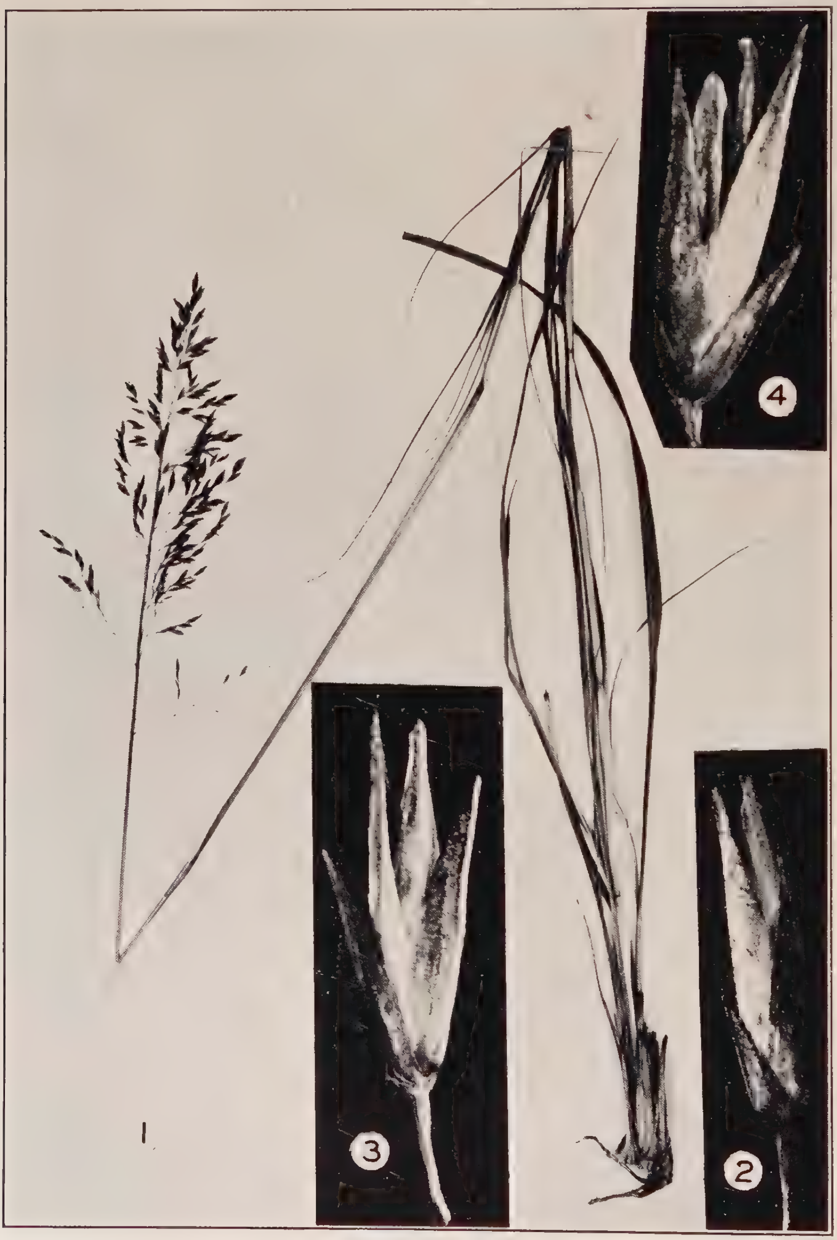

Photo. W. H. Hodge

Calamovilfa brevipilis: fig. 3, spikelet, × 10.
Var. calvipes: fig. 1, habit, × 2/5; fig. 2, spikelet, × 10.
Var. heterolepis: fig. 4, spikelet, × 10.

argillaceous field and exsiccated pond-hole, north of Skipper's, no. 9816. See p. 470.

Not mapped for Virginia in Hitchcock's Manual.

Agrostis elata (Pursh) Trin. The vegetative character pointed out in Rhodora, xxxix. 363 (1937) holds throughout the region. Characteristic of sphagnous bogs and wet pinelands, especially well developed in Greensville, Sussex and Dinwiddie Counties; there with very large panicles (up to 3.5 dm. long).

Aristida lanosa Muhl. Southampton County: dry white sand in woods, Terrapin Ridge, east of Drewryville, no. 8955.

Extension inland, 75 miles, from the coast of Princess Anne.

Leptochloa filiformis (Lam.) Beauv. To the few known Virginian stations add one in Greensville County: weed in cotton-field near Hitchcock Quarry, no. 9536.

Spartina alterniflora Loisel., var. glabra (Muhl.) Fern. Extending inland at least to Isle of Wight County: brackish marsh along Cypress Creek, Smithfield, no. 8957.

Ctenium aromaticum (Walt.) Hitchc. To the scattered Virginian stations recorded add one in Greensville County: sphagnous bog 1 mile northwest of Dahlia, no. 8550. See p. 472.

Leptoloma cognatum (Schultes) Chase. Frequent from Dinwiddie and Prince George Counties southward.

Usually flowering in late summer and autumn; found in good flower in Southampton County on June 20.

Axonopus furcatus (Flügge) Hitchc. Northward to York County: swale southeast of Tabb's, no. 8553.

Not seen by Grimes.

Paspalum dissectum L. To the few stations in Southampton County add an extensive one in Chesterfield County: margin of exsiccated old mill-pond in Swift Creek, Lakeview, no. 9254. See p. 477.

P. fluitans (Ell.) Kunth. See Fernald in Rhodora, xxxix. 282, tab. 474, figs. 6–13 (1937). To the stations in Southampton County add an extensive one in Chesterfield County: margin of exsiccated old mill-pond in Swift Creek, Lakeview, no. 9253. See p. 477.

Both *P. fluitans* and *P. dissectum* abound at this station. They are strongly contrasted in the mat of vegetation by the blue-green color of the latter, the warmer green of the former.

P. setaceum Michx., var. supinum (Bosc) Trin. (*P. supinum* Bosc.). To stations in Northampton and Princess Anne Counties add the following. Nansemond County: woods about 2 miles southeast of Cleopus, no. 8928.

*P. Urvillei Steud. Warwick County: dry railroad bank, Naval Mine Depot, north of Lee Hall, no. 8556. Nansemond County: railroad bank near lumber camp of Camp Lumber Co., Great Dismal Swamp, southeast of Whitemarsh School, no. 10,490.

A strikingly distinct species, evidently adventive along the Naval railway. Itself well armored with promptly deciduous fine stinging bristles on the lower sheaths! See p. 469.

P. praecox Walt., var. Curtisianum (Steud.) Vasey (*P. lentiferum* Lam.). To the single known Virginian station (in Sussex County) add one in Greensville County: sphagnous bog about 1 mile northwest of Dahlia, no. 9255. See p. 485.

*Panicum fusiforme Hitchc. Dinwiddie County: dry clearings and borders of woods south of Burgess Station, no. 8560.

Extension north from Georgia. See p. 469.

P. nitidum Lam. To the few Virginian stations add one in Greensville County: wet cut-over pine and oak woods near Three Creek, north of Emporia, no. 8561.

P. mattamuskeetense Ashe, var. Clutei (Nash) Fernald in Rhodora, xxxix. 386 (1937). Range extended inland to Greensville County: sphagnous bog about 1 mile northwest of Dahlia, no. 8562.

P. caerulescens Hack. To the single station in Princess Anne County cited by Hitchcock & Chase add one in Sussex County: moist (in midsummer exsiccated) argillaceous pineland about 2 miles east of Stony Creek, nos. 8940, 9525 and 10,500. Princess Anne County: inner border of brackish to fresh marsh along Back Bay, at eastern margin of Long Island, no. 10,501.

Certainly a very rare species in Virginia. See p. 476.

P. albomarginatum Nash. Inland to Greensville and Sussex Counties.

P. trifolium Nash. Inland to Dinwiddie County.

P. ensifolium Baldwin. Inland to Dinwiddie and Greensville Counties.

(*To be continued*)

DISTRIBUTION NOTES CONCERNING PLANTS OF GLACIER NATIONAL PARK, MONTANA—II

Bassett Maguire

During part of the summer of 1934, the writer, for a second time, had the opportunity to make observations on the flora of the Glacier National Park. The notes here presented are in continuation of the report made upon new or interesting records obtained in 1932 (Maguire 1934).

Botrychium silaifolium Presl. No. 5419,[1] common in bogs about Logging Lake. Altitude 3800 feet.

Equisetum sylvaticum L. No. 5422, common under conifer woodland, Park Creek. No. 5423, common in damp humus soil along streams in dense spruce woodland, Ole Creek.

This delicately branched horsetail is apparently quite commonly and generally distributed in the moist forests of the west slope. Altitude 4000–4500 feet.

Lycopodium Selago L. No. 5428, deep humus under thickets about the shore of Howe Lake. No. 15374, on floating log, Lincoln Lake.

These two new localities suggest that this clubmoss is quite commonly distributed about bogs in the western drainage of the Park. Altitude 4100–4500 feet.

*Equisetum pratense Ehrh. No. 5425, along sand bank in woodlands, inlet of Bowman Lake. Altitude 4020 feet.

*Isoetes Braunii Durieu. No. 5429, floating in Trout Lake.

These plants were not collected "in situ," but the large quantity found floating on the surface indicates that they are a common inhabitant of the lake. Altitude 3880 feet.

*Eriophorum gracile Koch. No. 5467, uncommon in bogs about Howe Lake. Altitude 4100 feet.

*Eriophorum viridi-carinatum (Engelm.) Fernald. No. 5468, common in wet meadows in the vicinity of Christensen's Ranch, 8 miles north of Fish Creek Ranger Station. Altitude 3780 feet.

*Scirpus hudsonianus (Michx.) Fernald. Rhodora **8**: 161. 1906; Gray's Man. 7th Ed. 1908. Wiegand and Eames, Flora Cayuga Lake, 1926, not *Eriophorum Chamissonis* C. A. Meyer. No. 5470, common in wet meadows in the vicinity of Christensen's Ranch, 8 miles north of Fish Creek Ranger Station. Altitude 3780 feet.

It is possible that this collection represents the *Eriophorum Chamissonis* of the Flora of Glacier Park (Standley 1921).

*Scirpus subterminalis Torr. No. 5563, infrequent, Lake McDonald. Altitude 3144 feet. Only sterile material seen.

Juncus filiformis L. No. 5549, wet meadows, vicinity of Christensen's Ranch. No. 5550, marshes along shore of Logging Lake.

These two additional stations suggest a fairly general distribution for this species of *Juncus*. Altitude 3780–3800 feet.

*Allium fibrillum M. E. Jones. *A. collinum* Dougl., not Guss. No. 15399, frequent in open parks, Upper Park Creek. Altitude 4500 feet.

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[1] These numerals represent the writer's collection numbers.

* The asterisk designates plants which seem not to have previously been reported from Glacier National Park.

Habenaria obtusata (Pursh) Richards. No. 5573, about inlet of Bowman Lake. No. 15411, frequent in deep, wet spruce woodland near inlet of Bowman Lake.

Reported by Standley (op. cit.) only from the vicinity of Lake McDermott on the east side of the park. Altitude 4020 feet.

*Polygonum Watsonii Small. No. 15463, sandy soil under second growth *Pinus Murrayana*, vicinity of Marias Pass. Altitude 5200 feet.

*Philadelphus Lewisii Pursh. No. 15529, very conspicuous on cliffs and rocky slopes along lower Ole Creek. Observed but not collected on slopes seen from the roadside, vicinity of St. Mary's Hotel. Altitude 4000–4500 feet.

Potentilla argentea L. No. 15822, common in dry gravelly places, Fish Creek Ranger Station. Altitude 3150 feet.

*Rubus arcticus L. No. 15824, common in wet mountain meadow, vicinity of Christensen's Ranch, 8 miles north of Fish Creek Ranger Station. Altitude 3800 feet.

Callitriche palustris L. No. 901, abundant on mud and in shallow water about pond near outlet of lower St. Mary Lake. No. 902, common in marshes south of John's Lake. No. 5600, below reservoir, ½ mile west of Summit R. R. Station, Marias Pass. Altitude 3150–5200 feet.

Callitriche hermaphroditica L. No. 903, abundant in 18 inches of water about inlet of St. Mary Lake. No. 904, in shallow pool along beach of Lake Josephine. No. 906, along mud bank, Swift Current Creek, below Swift Current Lake. No. 5601, in two feet of water, Rogers Lake. Altitude 3780–4860 feet.

*Hypericum perforatum L. No. 15865, along Bear Creek.

Possibly this weedy plant is of recent introduction to the park.

Linanthus Harknessii (Curran) Greene. No. 15622, common, open places in woodland, along trail to Ptarmigan Pass, 2 miles from Mary Glacier's Hotel. Altitude, 4600 feet.

*Galium tinctorium L., var. subbiflorum (Wieg.) Fern. No. 15605, marsh about pond, Ole Creek; common in wet mountain meadows, vicinity of Christensen's Ranch, 8 miles north of Fish Creek Ranger Station. Altitude 3780–5000 feet.

*Antennaria aprica Greene. No. 15759, slopes, Ole Creek. Altitude 4500 feet. No. 15758, open places, slopes, Ole Creek. Altitude 5000 feet. No. 15757, meadows about Lake Katherine, Ole Creek. Altitude 5500 feet.

*Antennaria fusca E. Nels. No. 15760, open slopes in Spruce-lodgepole woodlands, Ole Creek. Altitude 5500 feet. No. 15761, slopes, Ole Creek 15 miles above mouth. Altitude 5500 feet. No. 15762, along Ole Creek.

These two species of *Antennaria* occurred frequently and in extensively developed colonies on slopes in open woodlands and meadows along upper Ole Creek. It seems improbable that this one drainage should represent the entire distribution within the park.

In the earlier report, the writer (1934) made comment upon a number of species of *Arnica* collected in the park. Since that time he has carried on more detailed studies in the genus, the results of which make desirable corrections and further elaboration of the former notes.

*ARNICA RYDBERGII Greene. No. 1088, meadows at Cracker Lake. Altitude 6250 feet. No. 1089, above timber line, Piegan Pass. Altitude 7500 feet.

These records confirm the writer's former tentative determination. In addition, the writer has seen 5 collections of *P. C. Standley* (Nos. 16404, 16712, 17243, 15793, 15769, deposited in the U. S. National Herbarium), all of which are *A. Rydbergii*. It seems that these constitute primarily the basis for the inclusion of *A. alpina* (L.) Olin in Standley's "flora" (op. cit.).

The writer, in the same brief notes mentioned above, erroneously reported *A. diversifolia* from Glacier Park. It seems that this species has not been collected within the park boundaries.

Further, reference was made to certain plants which the writer had collected as "an exceedingly interesting form of the *Diversifolia* group which is not placeable in the above (*A. diversifolia*) species." Subsequently these plants formed the basis for specific distinction by Professor Nelson (1934) as *A. trina*[2] A. Nels. Subsequent examination of a much larger series of plants from Glacier Park demonstrated this form to be merely a large and few-headed phase, with 4–6 pairs of cauline leaves, of the polymorphic *A. amplexifolia* Rydb. (*A. amplexicaulis* Nutt., not Wall.). This local population predominantly occurs in the park, but intergrades there with the less frequent but more typical forms of the species. Therefore, this variant designated by Nelson as *A. trina* must become *Arnica amplexifolia* Rydb. var. **trina** (A. Nels.), comb. nov. A representative series of this variety is Maguire, Nos. 1095 (type number of *A. trina* A. Nels. deposited at the Rocky Mountain Herbarium), 1094 (cotype of *A. trina* A. Nels.), 1090, 15335, 15337, 15339, and P. C. Standley, Nos. 15601, 16668, 17286 and 18012 (deposited in the U. S. National Herbarium).

Also, in this earlier paper, the writer called attention to ". . .

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[2] *Arnica trina* A. Nelson. Am. Jour. Bot. **21**: 581. 1934.

a fine, large-leaved *Arnica* probably of *Foliosae* group . . . ". Subsequently, Professor Nelson paid the writer the gracious compliment of naming these plants *Arnica Maguirei*. Subsequent collections in the park area and study of large series of specimens from various American and European herbaria reveal the plants under discussion to be a giant local variant of the complex and polymorphic assemblage which has variously gone under the name of *A. foliosa* Nutt. and those of numerous untenable segregates, and that moreover this assemblage represents a southern geographical race[1] of the earlier *A. Chamissonis* Less.[2] Therefore this large-leaved, tall (6–9 dm. high) variant becomes *Arnica Chamissonis* subsp. *foliosa* (Nutt.) Maguire, var. **Maguirei** (A. Nels.), comb. nov. The typical form of the ssp. *foliosa* occurs frequently in the area, as do many intergrades to the var. *Maguirei*. Collections which represent this extreme variant are the writers Nos. 1098 (the type collection of *A. Maguirei*) and 15356, a topotype.

Unless otherwise designated, all collections mentioned in this paper are represented in the Herbarium of the Utah State Agricultural College.

Literature Cited

Maguire, Bassett. Distribution Notes Concerning Certain Plants of Glacier National Park. Rhodora **36:** 305. 1934.

Nelson, Aven. Rocky Mountain Herbarium Studies II. Am. Jour. Bot. **21:** 581. 1934.

Standley, P. C. Flora of Glacier National Park, Montana. Contr. U. S. Nat. Herb. **22:** Pt. 5. 1921.

Logan, Utah

LIST OF SECOND HUNDRED FUNGI OF NANTUCKET[3]

E. F. Guba

The island of Nantucket, Massachusetts, presents a fertile field of effort to one interested in its mycologic flora. Its ferns and flowering plants have been thoroughly worked by Bicknell[4] whose contributions on the subject are of inestimable value in the identification of the plant parasitic fungi. This small remote island with circumscribed limits presents the opportunity and the satisfaction of obtaining a completeness of representation of its flora that is not easily possible for areas on the mainland. The arrangement of the vegetation on Nantucket, in rather definite limited masses determined by localized factors of soil, elevation, water, etc., as heath, bog, deciduous forest, sand dune, salt marsh vegetation and other types, offers a striking and appealing diversification to the collector and enables a complete representation especially of the most evident fungi, without much travel.

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[1] *Arnica Chamissonis* Less. subsp. **foliosa** (Nutt.) Maguire, comb. nov. *Arnica foliosa* Nutt. Trans. Am. Phil. Soc. **11.** 7: 408. 1841.

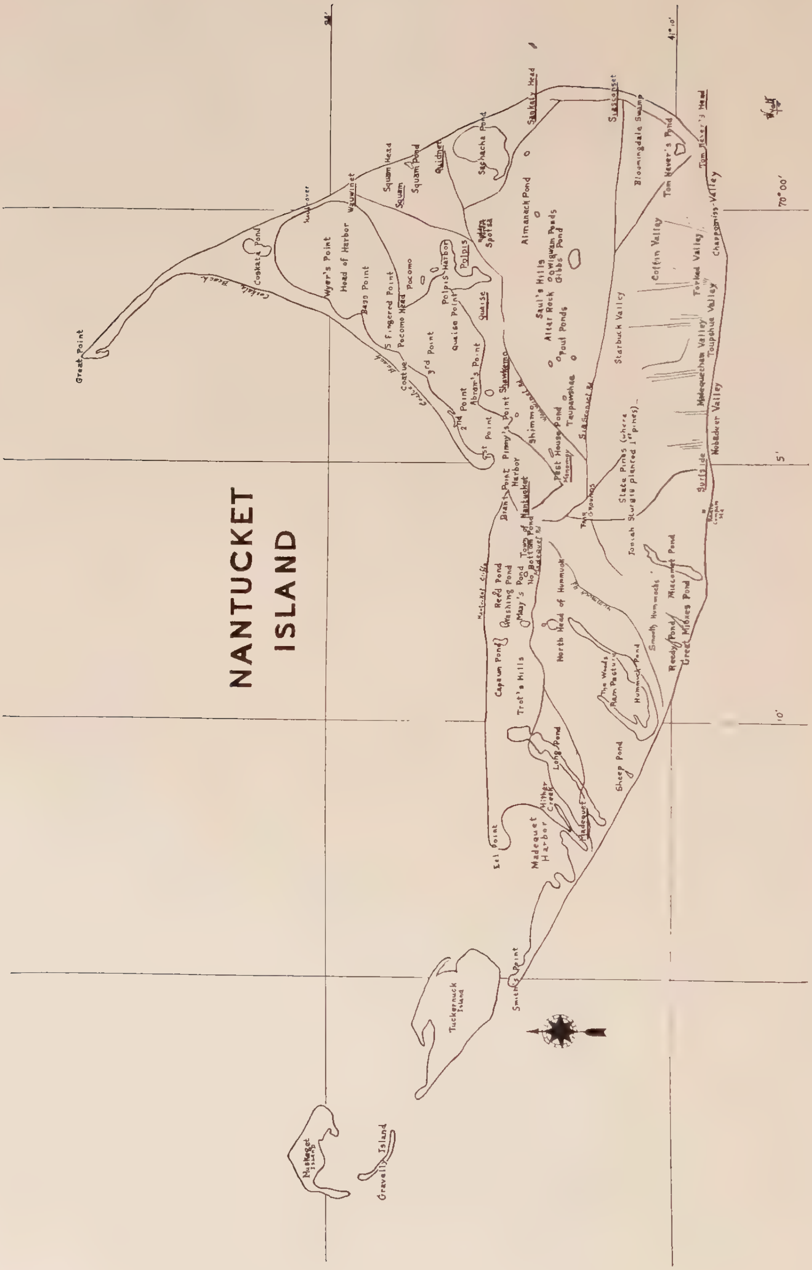
[2] *Arnica Chamissonis* Lessing. Linnaea **6:** 238. 1831.

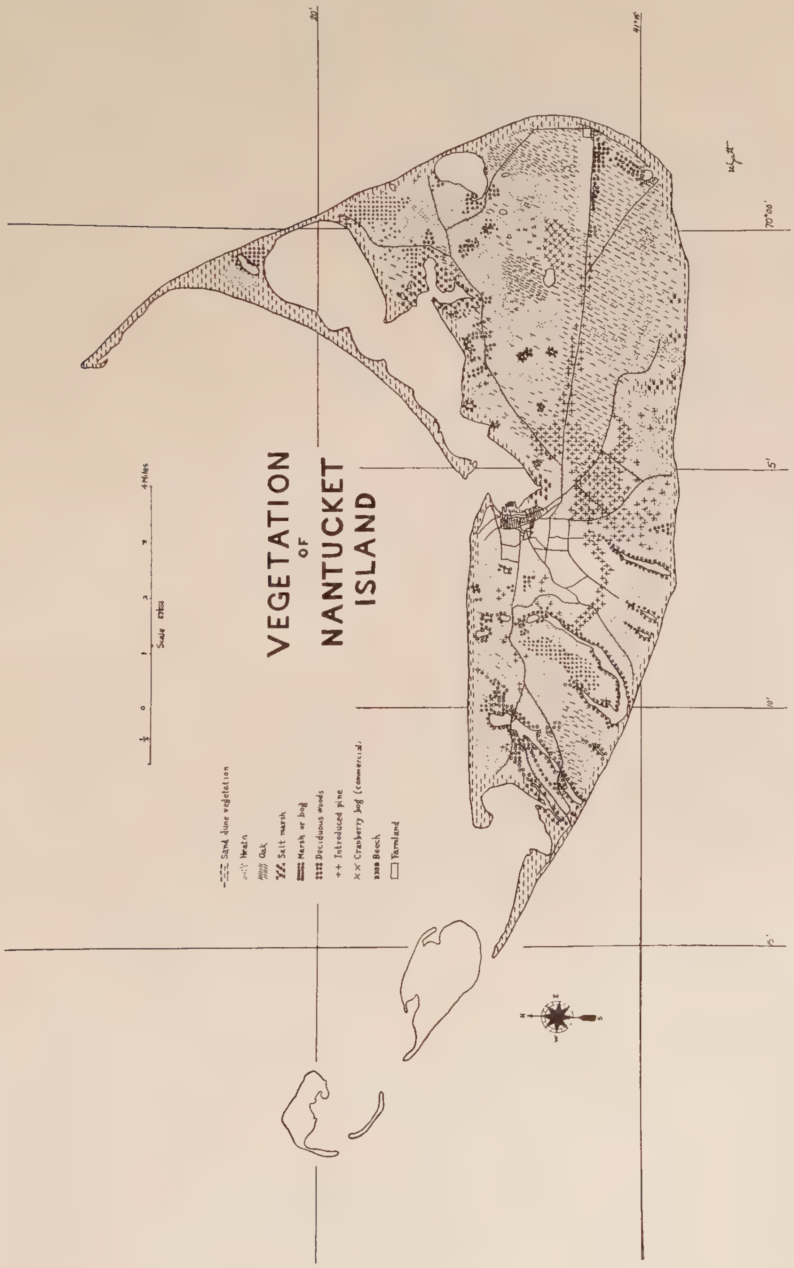
[3] Contribution Vol. IV No. 1 of the Nantucket Maria Mitchell Association, Div. of Natural Science, Nantucket, Mass. For the List of the First Hundred see Rhodora **39:** 367–376, 1937. The cost of illustration is met by the author and by the Maria Mitchell Association.

[4] For bibliography, see first list of Nantucket Fungi.

The charm of Nantucket and its fascinating ecological and climatic features have indirectly and lately served to attract others to an interest in its mycologic flora. It is hoped that these contributions, infrequent as they must necessarily be, will serve as a foundation for others to enlarge upon this effort and encourage other scientific pursuits on Nantucket. I am grateful to Mr. E. V. Seeler, Jr., a frequent visitor to Nantucket, for his generous contributions to this second list and to Dr. D. H. Linder of Harvard University for aid rendered him in making the determinations of some of his collections and for the preparation of the Latin descriptions of three new species reported in this paper; to Mr. C. J. Gilgut of the Massachusetts State College for the identification of some of the collections; finally to Mr. James P. Kimball, resident of the island, for certain collections of fleshy fungi. All of the other collections and identifications are by the writer whose visits to the island from time to time have been restricted to vacation periods.

A factor encouraging the pursuit of scientific effort in any region is the stimulating enthusiasm offered by the inhabitants. The people of Nantucket from the earliest times have fostered an interest in the natural sciences peculiar to the island. The study of its flora has been given considerable attention. In recent years this work has been energetically promoted by Miss Grace Wyatt, Director of Natural Science of the Nantucket Maria Mitchell Association. I am gratefully indebted to her for the fine maps of Nantucket showing the vegetation, ponds, hills, contours, etc., which are presented here to render more complete the reader's concept of the flora of the island. The original vegetation map of Nantucket by Harshberger published in 1914 has served as a guide in the preparation of the latest maps.


NANTUCKET ISLAND
Great Point
Coskata Pond
Coskata Beach
Wauwinet
Squam Head
Squam
Squam Pond
Quidnet
Sesachacha Pond
Sankaty Head
Siasconset
Bloomingdale Swamp
Tom Never's Pond
Tom Never's Head
Chappomiss Valley
Almanack Pond
Gibbs Pond
Saul's Hills
Altar Rock
Coffin Valley
Forked Valley
Starbuck Valley
Toupshue Valley
Madequecham Valley
Nobadeer Valley
Wyer's Point
Head of Harbor
Bass Point
5 Fingered Point
Pocomo Head
Pocomo
Polpis Harbor
Polpis
Quaise Point
Quaise
3rd Point
2nd Point
1st Point
Coatue
Abram's Point
Pimny's Point
Shawkemo
Shimmo
Brant Point
Harbor
Town of Nantucket
Poul Ponds
Taupawshas
Pest House Pond
Monomoy
Sia Sconset Rd
State Pines (where Josiah Sturgis planted 1st pines)
Surfside
Reed Pond
Washing Pond
Maxcy's Pond
Capaum Pond
Trot's Hills
North Head of Hummock
Hummock Pond
The Woods
Ram Pasture
Miacomet Pond
Smooth Hummocks
Reedy Pond
Great Mioxes Pond
Long Pond
Sheep Pond
Hither Creek
Madaket
Madaket Harbor
Eel Point
Smith's Point
Tuckernuck Island
Muskeget Island
Gravelly Island
41° 10′
70° 00′
5′
10′


VEGETATION
OF
NANTUCKET
ISLAND
Sand dune vegetation
Heath
Oak
Salt marsh
Marsh or bog
Deciduous woods
++ Introduced pine
×× Cranberry bog (commercial)
Beech
Farmland
Scale
½
0
1
2
3
4 Miles
20'
41°15'
70°00'
5'
10'
15'
N
E
S
W

An idea of the changes in the mass vegetation of the island since 1914 may be acquired from a study of these maps.

List of Second Hundred Fungi of Nantucket

101. Alternaria Brassicae (B.) Sacc. On living leaves of *Brassica Rapa* L. Farm land at southern end of Hummock Road. Aug. 17, 1936. Very common especially on the lower leaves.
102. Alternaria Solani (Ell. & Martin) Jones & Grout. On living leaves of cultivated *Solanum tuberosum* L. Nursery and market garden outside of town on the Madaket Rd. Aug. 15, 1936. Very common. Familiar in plant pathological literature as "early blight."
103. Alternaria Solani (Ell. & Martin) Jones & Grout. On living leaves of *Lycopersicum esculentum* Mill. Same location as No. 102. Very common.
104. Amanita rubescens Pers. Very abundant on ground in mat of pine needles, State White Pines south of Fair Grounds. Aug. 7, 1938. Coll. & det. by *E. V. Seeler, Jr.*
105. Apiosporina Collinsii (Schw.) V. Höhnel. On leaves of *Amelanchier canadensis* (L.) Medic. Beach Rd. to Quidnet near Wauwinet, June 25, 1938. Coll. and det. by *E. V. Seeler, Jr.*

This fungus causes a widespread witches broom characterized by numerous branches in which the mycelium of the parasite is perennial and by the development of a rich olivaceous or sooty mold of Cladosporium on the lower leaf surfaces. The perithecial stage develops in late summer in the sooty mold. Injury to the host is slight.

106. Ascochyta graminicola Sacc. On leaves of *Agropyron repens* (L.) Beauv. In fields along the Madaket Rd. Aug. 16, 1936.
107. Ascochyta Lophanthi J. J. Davis var. lycopina J. J. Davis. On living leaves of *Lycopus uniflorus* Michx. On the border of Capaum Pond. Oct. 1, 1936.
108. Boletus castaneus Bull. On lawn in shade of *Quercus alba* L., 20 Orange Street. Coll. by *E. V. Seeler, Jr.* July 28, 1938. Det. by D. H. Linder.
109. Boletus edulis (Bull.) Fr. Sept. 18, 1937. Coll. by *Chas. P. Kimball.* Det. by C. J. Gilgut.
110. Boletus felleus (Bull.) Fr. Sept. 18, 1937. Coll. by *Chas. P. Kimball* in pine woods east of his residence. Det. by C. J. Gilgut. Also collected and identified by *E. V. Seeler, Jr.*, State Pines south of Fair Grounds, Aug. 7, 1938.
111. Boletinus pictus Pk. On ground in mat of needles of *Pinus Strobus* L. State Pines south of Fair Grounds. Aug. 7, 1938. Coll. by *E. V. Seeler, Jr.* Det. by D. H. Linder.
112. Camarosporium metableticum Trail. On brown weathered

foliage of *Ammophila breviligulata* Fern. End of hard road at Madaket. Oct. 1, 1936. Common.

113. CERCOSPORA LATHYRI Dearn. & House. On living leaves of *Lathyrus maritimus* Bigel. Along the Haulover to Coskata. Aug. 15, 1936. Common, appearing in round to elliptical pale spots with distinct purple margins.

114. CERCOSPORA RHOINA C. & E. On leaves of *Rhus copallina* L. On eastern area of the Island. Sept. 30, 1936. Very noticeable toward latter part of season by distinct brown to purple spotting of the leaflets.

115. CLADOSPORIUM **Lysimachiae** Guba sp. nov., conidiophoris amphigenis plerumque epiphyllis, primo in maculis parvis rotundatisque aggregatis deinde in pagina inferiore per vena foliorum crebrescentibus, fuscis, septatis, simplicibus vel nonnumquam sinuosis vel geniculatis, 3.8–5 μ diametro, 63–110 μ longitudine; conidiis uniseptatis, pallide virescentibus, oblongo-ellipsoideis, 12–19 x 5.3–6.3 μ, non vel leviter ad septum constrictis.

Conidiophores amphigenous, for the most part epiphyllous, at first collected in small circular areas on the upper surface of the leaves and then spreading out from the venation on the lower surfaces, decumbent, dark olivaceous, sparsely septate, simple, mostly somewhat geniculate and with numerous spore scars, 3.8–5 μ in diameter, 63–110 μ long. Conidia 2-celled, pale greenish under the microscope, pecan-shaped or elongate-ellipsoid, 12–19 x 5.3–6.3 μ, slightly or not constricted at the septum, spore walls smooth.—On living leaves, rarely on the stems of *Lysimachia vulgaris* L. In waste places near the water front east of Main St., Aug. 15, 1936. Both upper and lower surfaces of the leaves are richly blotched with the dark olive wefts of the fungus.

116. CLAVARIA AMETHYSTINA (Batt.) Bull. Sept. 18, 1937. Coll. by *Chas. P. Kimball*. Det. by C. J. Gilgut. Very common in the pine woods on the island. Other collections made in August.

117. CLAVARIA FUSIFORMIS Sow. Hidden Forest. Oct. 1, 1936. Coll. by *H. S. Tiffany*. Det. by C. J. Gilgut.

118. CLAVARIA INAEQUALIS Mull. In Pine Woods. General on the Island. Aug. 12, 1936. Det. by C. J. Gilgut.

119. CLAVICEPS PURPUREA (Fr.) Tul. On *Spartina alterniflora* Loisel. var. *pilosa* (Merr.) Fern. with *Uromyces acuminatus* Arth. III. Oct. 1, 1936. Long Pond, Madaket.

120. CLITOCYBE GIGANTEA (Sow.) Quel. Sept. 18, 1937. Coll. by *Chas. P. Kimball*. Det. by C. J. Gilgut.

121. COCCOPHACIDIUM CEMBRAE Rehm. On lower dead branches of *Pinus Strobus* L. State Pines south of Fair Grounds. Coll. and Det. by *E. V. Seeler, Jr.* May 15, 1938. Fruiting bodies of circular outline and about 1 mm. in diameter, densely dotting the bark. Spores of smaller size than *C. Pini* (Fr.) Karst.

122. Coleosporium Solidaginis (Schw.) Thüm II. On living leaves of *Aster novi-belgii* L. Basset Jones Estate, Polpis. Sept. 30, 1936. Common on asters at this season.
123. Coleosporium Solidaginis (Schw.) Thüm II. On living leaves of *Aster ericoides* L. (*A. multiflorus* Ait.) In places along the Siasconset Rd. Sept. 28, 1936.
124. Craterellus cornucopioides Fr. Hidden Forest. Oct. 1, 1936. Det. by C. J. Gilgut.
125. Crucibulum vulgare Tul. On fallen twigs and leaves of *Fagus grandifolia* Ehrh., Hidden Forest, Aug. 5, 1938. Coll. & det. by *E. V. Seeler, Jr.* Fruiting bodies resting on substrata like bird's nests.
126. Cytospora ambiens Sacc. On dead or withering twigs of *Ulmus americana* L. East of Main Street near water front. Coll. by *Walter Eger,* Sept. 15, 1935.
127. Dacryomyces aurantius (Schw.) Farlow. On bark of dead branch of *Pinus rigida* Mill. State Pines south of Fair Grounds, May 15, 1938. Coll. and det. by *E. V. Seeler, Jr.*
128. Daedalia confragosa (Bolt.) Pers. On *Salix sp.* Hidden Forest, May 30, 1936. Coll. & det. by *I. H. Crowell.*
129. Daedalia confragosa (Bolt.) Pers. On large dead tree of cultivated *Prunus* (cherry). Yard at 20 Orange Street, Aug. 19, 1938. Coll. and det. by *E. V. Seeler, Jr.*
130. Darluca filum (Biv.) Cast. Occurring on uredospores of *Puccinia Menthae* Pers. on living leaves of *Pycnanthemum muticum* (Michx.) Pers. North edge of Nantucket's largest cranberry bog and approaching Saul's Hills. Coll. and det. by *E. V. Seeler, Jr.* July 31, 1938.
131. Dasycypha Ellisiana (Rehm.) Sacc. On dead branches of *Pinus Strobus* L. State Pines south of Fair Grounds. May 15, 1938. Coll. and det. by *E. V. Seeler, Jr.* Also on dead branches of *Pinus rigida* Mill. Same location, May 15, 1938. Coll. and det. by *E. V. Seeler, Jr.* and reported to be very common.
132. Didymella Iridis (Desm.) Tisdale. On dying leaves of *Iris versicolor* L. Capaum Pond, Oct. 1, 1936. Brown or orange elongate lesions coalescing and blighting the green leaves.
133. Diplodia Smilacina B. On spots on living leaves of *Smilax rotundifolia* L., associated with *Sphaeropsis Smilacis* Ell. & Everh. In thicket at Polpis, Oct. 1, 1937.
134. Discosia faginea Lib. On brown over-wintered leaves of *Fagus grandifolia* Ehrh., Hidden Forest, May 30, 1936, with No. 156, *Mycosphaerella punctiformis* (P. ex. Fr.) Schrt.
135. Ditiola radicata (Alb. & Schw.) Fr. On bark on dead branches of *Pinus rigida* Mill. State Pines south of Fair Grounds. Coll. and det. by *E. V. Seeler, Jr.*
136. Erysiphe Cichoracearum DC. On leaves and stems of *Verbena hastata* L. South of Coskata Pond. Aug. 16, 1936. Epidemic

on this host. Powdery mildew covering the foliage and richly dispersed with perithecia. The lower leaves killed off.

137. Erysiphe Cichoracearum DC. On living leaves of *Solidago altissima* L. Polpis. Sept. 29, 1936.

138. Erysiphe communis Auct. Amer. On leaves of *Ranunculus acris* L. About abandoned cottage at Siasconset. Oct. 1, 1936.

139. Exidia recisa (Dittm.) Fr. On dead branch on living tree of *Quercus velutina* Lam. State Pines south of Fair Grounds, Aug. 11, 1938. Coll. & det. by *E. V. Seeler, Jr.*

140. Exoascus deformans (B.) Fckl. = *Taphrina deformans* (B.) Tul. On leaves of old seedling of *Prunus persica* Sieb. & Zucc. in yard to rear of business block on Main Street, May 30, 1937.

141. Fomes applanatus (Pers.) Wallroth. On exposed wood of trunk of large living tree of *Gleditsia triacanthos* L., Union and Coffin Streets, July 25, 1938. Coll. and det. by *E. V. Seeler, Jr.* Also collected by the author on other hosts on the island.

142. Fomes connatus (Weinman) Gillet. On exposed heartwood of *Acer Negundo* L., sidewalk tree, Pine and School Streets. Aug. 29, 1938. Coll. and det. by *E. V. Seeler, Jr.*

143. Fomes connatus (Weinman) Gillet. On trunk of *Acer rubrum* L., Hidden Forest, Aug. 5, 1938. Coll. & det. by *E. V. Seeler, Jr.*

144. Fuligo septica (L.) Weber. On bark of trunk of dead *Prunus sp.* (sweet cherry), back yard of 20 Orange Street, Aug. 19, 1938. Coll. & det. by *E. V. Seeler, Jr.* This slime mold because of its frequent occurrence on spent bark is popularly known as "flowers of tan."

145. Geaster hygrometricus Pers. In woods of *Pinus rigida* Mill., south of Town of Nantucket. May 29, 1937 (= *Astraeus hygrometricus* (Pers.) Morg.).

146. Gloeosporium nervisequum (Fckl.) Sacc. On blighted twigs of large plane tree, *Platanus occidentalis* L., corner of Ray's Court and Main Street, May 29, 1937.

This famous old tree cited in many publications on Nantucket shows the effect of many years of struggle with infections of this anthracnose fungus. Witches brooms are clustered about the entire branchwork of the tree and rhizomorphs of *Armillaria mellea* (Vahl) Quel. (see Coll. No. 1) have developed extensively under the bark at the trunk and throughout the base of the tree. This tree, with others on Main Street in the town, seems to have suffered and succumbed to a lethal influencing factor, probably illuminating gas from street mains in 1934 to 1935.

147. Gloeosporium profusum Ell. & Ev. On living leaves of *Corylus americana* Walt., Polpis, Oct. 1, 1936. Large brownish spots

with yellowish margins often limited by midrib or veins and in severe cases browning a large portion of the leaf.

148. GUIGNARDIA BIDWELLII (Ell.) Viala & Ravaz. On rotted berries of cultivated grape, *Vitis vinifera* L., Nantucket town, Aug. 3, 1938. Coll. by *Grace Wyatt.*

149. GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE Schw. On *Juniperus virginiana* L., Wauwinet Road out of town of Nantucket. May 29, 1937.

150. IRPEX CINNAMOMEUS Fr. On dead branch of *Quercus velutina* Lam., State Pines south of Fair Grounds. Coll. by *E. V. Seeler, Jr.* July 30, 1938. Det. by D. H. Linder.

151. LEOTIA CHLOROCEPHALA Schw. Coll. by *Chas. P. Kimball,* Sept. 18, 1937. Det. by C. J. Gilgut.

152. LOPHODERMIUM PINASTRI (Schrad.) Chev. On needles of *Pinus sylvestris* L. Along Siasconset Road, May 30, 1937.

153. MERULIUS AMERICANUS Burt. In pine plank flooring causing destructive rot in cellar on Main Street. Oct. 31, 1937. Coll. by *E. V. Seller, Jr.* Det. by D. H. Linder.

154. MACROPHOMA CANDOLLEI (Berk. & Br.) Berl. & Vogl. On brown blighted fallen leaves of *Buxus sempervirens* L. Garden at 18 Orange Street. July 17, 1938. Coll. by *E. V. Seeler, Jr.* Also common in box plantings about the town according to the author's observations.

155. MICROGLOSSUM FUMOSUM (Peck) Durand. On ground, Hidden Forest, July 31, 1938. Coll. by *E. V. Seeler, Jr.* Det. by D. H. Linder.

156. MYCOSPHAERELLA PUNCTIFORMIS (P. ex Fr.) Schrt. On over-wintered leaves of *Fagus grandifolia* Ehrh. in Hidden Forest, May 30, 1936. Associated with *Discosia faginea* Lib.

157. NECTRIA CINNABARINA (Tode ex Fr). On branches of *Hibiscus syriacus* L. in garden rear of Maria Mitchell Cottage, Vestal Street. Oct. 3, 1936.

158. PERONOSPORA VICIAE Auct. Amer. On living leaves of *Vicia sativa* L. in field opposite Franklin fountain along Madaket Road, May 30, 1937. This downy mildew was the cause of a blighting of the foliage.

159. PESTALOTIA HYSTERIFORMIS B. & C. On pale brown spots on living leaves of *Quercus velutina* Lam. Border of Hidden Forest. Sept. 30, 1937. Common.

160. PHYLLACHORA GRAMINIS (P. ex Fr.) Fckl. On *Agropyron repens* (L.) Beauv. About the "Woods" approaching the Maria Mitchell farmhouse from Madaket Road. Aug. 18, 1936.

161. PHYLLACHORA GRAMINIS (P. ex Fr.) Fckl., var. PANICI (S.) Shear. On dead over-wintered *Panicum virgatum* L. June 1, 1936.

162. PHYLLOSTICTA EPIGAEAE Pk. On leaves of *Epigaea repens* L., causing leaf spotting and blighting, Smooth Hummocks, May 31, 1937.

163. Phyllosticta illinoensis Tehon & Daniels. On living leaves of *Sassafras variifolium* (Salisb.) Ktze. Hidden Forest, Oct. 1, 1936. Det. by C. J. Gilgut. Brown spots, center ash gray and falling out with age, border dark, coalescing and blighting the leaves.

164. Phyllosticta orobella Sacc. On leaves of *Lathyrus maritimus* Bigel. Radio Compass Station, May 31, 1937. Det. by C. J. Gilgut. Gray elliptic spots with bright purple margins.

165. Plasmopara pygmaea (Ung.) Schrt. On living leaves of *Anemone quinquefolia* L. Hidden Forest and in thickets on south side of Polpis Road out of town. May 30, 1937.

166. Polyporus perennis (L.) Fr. On ground in Hidden Forest, Aug. 5, 1938. Coll. & det. by *E. V. Seeler, Jr.*

167. Polyporus semisupinus Berk. & Curt. On dead branch of *Quercus velutina* Lam. State Pines south of Fair Grounds. July 30, 1938. Coll. by *E. V. Seeler, Jr.* Det. by E. V. Seeler, Jr. and D. H. Linder.

168. Polyporus sulphureus (Bull.) Fr. On *Gleditsia triacanthos* L. From town on Wauwinet Road. Oct. 24, 1936. Coll. and det. by *E. V. Seeler, Jr.*

169. Puccinia Andropogonis Schw. III. On *Andropogon scoparius* Michx. East of south end of Hummock Road. Aug. 20, 1936.

170. Puccinia angustata Peck III. On *Scirpus cyperinus* (L.) Kunth. Along Long Pond near Madaket Road, Aug. 15, 1936. Very common.

171. Puccinia Asteris Duby. III. On *Aster puniceus* L. In field at Polpis near Basset Jones Estate. Oct. 1, 1936. Det. by C. J. Gilgut.

172. Puccinia canaliculata (Schw.) Lagerh. II. On *Cyperus esculentus* L. In low places bordering corn field at south end of Hummock Road. July 16, 1936.

173. Puccinia coronata Cda. II, III. On leaves of *Agropyron repens* (L.) Beauv. Along the roadside, Madaket, Aug. 16, 1936.

174. Puccinia graminis Pers. O, I. On leaves of *Berberis vulgaris* L., State Pines near Miacomet Pond. May 30, 1936.

175. Puccinia Helianthi Schw. III. On living leaves of *Helianthus tuberosus* L. In thicket border in field south of road to Polpis. Sept. 30, 1936.

176. Puccinia Hieracii (Schum.) Mart. III. On living leaves of *Taraxacum officinale* Weber. Siasconset about cottages. Oct. 1, 1936.

177. Puccinia investita Schw. II. On leaves and stems of *Gnaphalium polycephalum* Michx. In fields west of south end of Hummock Pond. Common all over the Island destroying the lower leaves of this plant. Aug. 16, 1936.

178. Puccinia Iridis (DC) Wallr. III. On living leaves of *Iris versicolor* L., Hidden Forest. Aug. 15, 1936. Common and destructive in this locality.

179. PUCCINIA MALVACEARUM Bert. III. On *Althaea rosea* (L.) Cav. In border planting in garden, Nantucket town. Aug. 15, 1936.

180. PUCCINIA MALVACEARUM Bert. III. On *Malva rotundifolia* L. Around shops on water front in Nantucket town. May 30, 1937.

181. PUCCINIA RUBIGO-VERA (DC) Wint. var AGROPYRI (Erikss.) Arthur II. On leaves and stems of *Holcus lanatus* L. Long Pond, near Madaket Road, Aug. 15, 1936.

182. PUCCINIA RUBIGO-VERA (DC) Wint. var. AGROPYRI (Erikss.) Arthur III, associated with *Puccinia coronata* Cda. III. On leaves of *Agropyron repens* (L.) Beauv. Roadside, Madaket. Aug. 15, 1936. Some of the telial stage of both species also present.

183. PUCCINIA RUBIGO-VERA (DC) Wint. var. SECALIS (Erikss.) Carl. II. On *Secale cereale* L. near Franklin fountain, Madaket Road, May 30, 1937. Very common.

184. PUCCINIA SEYMOURIANA Arth. II, III. On *Spartina Michauxiana* Hitchc. Along Long Pond, Madaket. Aug. 12, 1936.

185. PUCCINIA SORGHI Schw. II. On *Zea Mays* L., occurring in epidemic fashion and rendering the foliage conspicuously red from the distance. On farm at south end of Hummock Road. Aug. 15, 1936.

186. PUCCINIASTRUM PUSTULATUM (Pers.) Diet. II, III. On *Epilobium densum* Raf. South of Coskata Pond, Aug. 16, 1936.

187. RAMULARIA TARAXACI Karst. On living leaves of *Taraxacum officinale* Weber. Siasconset about cottages. Oct. 1, 1936.

188. RHYTISMA CURTISII B. & Rav. On living leaves of *Ilex opaca* Ait. Hidden Forest, May 29, 1936. Coll. by *Mrs. E. F. Guba.* Det. by D. H. Linder. Fungus common in this locality at this season appearing as reddish cushions breaking through the upper leaf surface.

189. RUSSULA EMETICA Fr. Coll. by *James P. Kimball* in woods near his residence. Sept. 18, 1937. Det. by C. J. Gilgut.

190. SCODELLINA LEPORINA (Batsch) S. F. Gray. Abundant in leaf mold on ground. Hidden Forest, July 31, 1938. Coll. and det. by *E. V. Seeler, Jr.*

191. SEPTORIA **Plucheae**, sp. nov., maculae orbiculares pallide brunneae interdum translucentes margine obscuro purpurascente vel rubescente, usque 0.5 cm. diametro, coalescentes; pycnidiis atris, globosis, minutis, punctiformibus, amphigenis, 70–110 μ diametro; conidiis multiseptatis, anguste filiformibus et ad apicem fastigiatis, curvulis, 30–63 x 1.5 μ.

Spots on leaves pale brown with indefinite purplish or reddish border, sometimes somewhat transparent, circular, up to .5 cm. in diam., coalescing and blighting the leaves. Pycnidia black, globose, minute, punctiform, amphigenous, rather sparse, 70–110 μ in diam. Conidia narrowly filiform or linear and tapering at the apex, multiseptate, somewhat curved, 30–63 x 1.5 μ.—

On living leaves of *Pluchea camphorata* (L.) DC. in marshy area bordering Coskata Pond. Aug. 16, and Oct. 1, 1936. Fungus causes circular leaf spots with purple margins in severe cases blighting and defoliating the plants.

192. Septoria **Ligustici**, sp. nov., pycnidiis 60–100 μ diametro, amphigenis numerosis atris, globosis punctiformibusque, in maculis irregularibus; conidiis continuis, linearibus plerumque 12–22 rare usque 28 μ longitudine, 1.5 μ diametro.

Pycnidia 60–100 μ in diam., amphigenous, numerous, black, globose, punctiform, in irregular spots with indefinite borders and often with pale centers coalescing and blighting the leaves, similar to Septoria celery blight excepting that pycnidia are less conspicuous. Conidia continuous, linear, usually rather short, 12–22 x 1.5 or rarely up to 28 μ long.—On blighted leaves of *Ligusticum scothicum* L. about Capaum Pond. Oct. 1, 1936.

193. Sphaeropsis Ellisii Sacc. On dead cut-off branches of *Pinus rigida* Mill. between Hummock and Miacomet Ponds, May 30, 1936. Coll. by *C. J. Gilgut.*

194. Sphaeropsis Smilacis Ell. & Ever. On spots on living leaves of *Smilax rotundifolia* L. In thicket at Polpis, Oct. 1, 1937, with *Diplodia Smilacina* B.

195. Steganosporium acerinum Pk. On dead twig of *Acer Pseudo-Platanus* L. in yard on Fair Street in town. Aug. 19, 1937. Coll. & det. by *E. V. Seeler, Jr*

196. Strobilomyces strobilaceus (Scop.) Berk. On ground in mat of pine needles, State Pines south of Fair Grounds. Aug. 11, 1938. Coll. and det. by *E. V. Seeler, Jr.*

197. Thyronectria denigrata (Winter) Seaver. On bark of *Gleditsia triacanthos* L., 92 Main Street; also at "Driftwood Estate" at Brant Point, Oct. 17, 1936. Coll. and det. by *E. V. Seeler, Jr.* Fungus is more commonly known as *Pleonectria denigrata* Winter.

198. Trichoglossum Farlowi (Cke.) Durand. In leaf mold on ground, Hidden Forest, Aug. 5, 1938. Coll. by *E. V. Seeler, Jr.* Det. by D. H. Linder.

199. Tricholoma personatum Fr. In pine woods bordering Siasconset Road, Oct, 1. 1936. Det. by C. J. Gilgut.

200. Tricholoma rutilans (Schaef.) Quel. Coll. by *Chas. P. Kimball,* Sept. 18, 1937. Det. by C. J. Gilgut.

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